2010 Winter Games Labour Demand Analysis

Presented to:

2010 Winter Games Human Resources Planning Committee

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This technical report was prepared for the 2010 Winter Games Human Resources Planning Committee. Any errors or omissions in this report are the responsibility of Roslyn Kunin & Associates, Inc. (RKA). The Committee has formally accepted this report, but it does not necessarily agree with all of its conclusions, interpretations, recommendations, etc.

Executive Summary

The Vancouver/ Whistler 2010 Olympic Games will generate a significant increase in the demand for labour in British Columbia, starting now (2003) and continuing to 2015 and beyond. Related projects such as the Sea to Sky highway upgrade, the Richmond Airport Vancouver (RAV) rapid transit line and the Vancouver Convention and Exhibition Centre (VCEC) expansion will also create the need for additional workers, though it should be noted that such projects could occur independently of the Olympic Games.

The Olympic Bid Secretariat is developing an Economic Opportunity Strategy to maximize the returns from hosting the 2010 Winter Olympics in collaboration with the federal government and other key agencies. In support of that Strategy, this study by Roslyn Kunin & Associates, Inc. (RKA) has the objective of breaking down total labour demand from the Olympics and related projects in terms of sectoral, occupational, regional, temporal and other factors, which will enable identification of demand/supply gaps and training implications, and development of plans and strategies to address the expected incremental demand.

Both absolute numbers of job growth and rates of growth are provided. (The reader should note that a high rate of growth in a small industry or occupation could result in relatively few jobs –or that a low rate of growth in a large industry or occupation could result in relatively many jobs.) Games related growth rates are compared to base rates of job growth expected in industries and occupations in British Columbia independent of the Games.

One of the goals of the 2010 Winter Games Human Resources Planning Committee is to work towards maximizing opportunities outside of the Lower Mainland. The process for gathering information for this report has taken into consideration wherever possible the impacts and possible outcomes for areas outside of those where the Games and major projects will take place. The immediate impacts may be most apparent in those areas, but we endeavoured to see how the impacts may be far-reaching, and what implications they may have for other regions and the "heartland" of the province. Later work by the Committee will be able to build on this information to lead towards strategies to maximize opportunities for those areas.

Methodology (found in Chapter 2)

The progression of this demand analysis can be represented as a sum of several components:

Base Openings Including New Jobs due to Economic Growth

And Replacement Jobs
(source: COPS – see page 8)

+

Incremental Growth
Due to
2010 Games, VCEC expansion,
Sea-to-Sky Highway upgrade,
Richmond-Airport-Vancouver Rapid Transit
Project (Sources of Data: see Page 6)

=

Total Growth or Increase of
Labour Demand

For all growth, RKA includes estimates of:

- Direct impact (labour demand of the Games or related projects themselves)
- Indirect impact (the change in labour demand in industries that supply goods and services to the Games and related projects)
- Induced impact (changes in labour demand over all sectors of the economy as a result of income increase in households impacted both directly and indirectly).

We begin with total labour demand from two recent studies: *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates* (BC Trade Investment Office, January 2002), and *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: an Update* (InterVISTAS Consulting Inc., October 2002), plus the estimates provided by the agencies responsible for the related projects. We use BC Stats estimates of the direct employment impact and the derived indirect and induced impacts by industry using the BC Input-Output Model.

For total job openings expected to materialize in BC's labour market without the occurrence of the Games or related projects (i.e., total openings in the base model) we have relied upon employment projections by industry and by occupation available from the Canadian Occupational Projection System, or COPS, model.

The Ministry of Skills Development and Labour's work on skill shortages has been an important input to this report.

Other sources of data we have used are intensive literature review and a series of interviews with key informants (see Appendix A).

Unfortunately, there are no readily available regional employment projections models for the province. The topic is important and further work to develop it in the future is suggested.

Finally, we note that our unit of measurement throughout the report is person years of employment.[1] Such were the terms used in the two economic impact studies just mentioned. We recognize the fact that employment estimates in the COPS include all arrangements of employment: full-time, part-time, permanent, contract, or casual work. Therefore they are not equivalent to person years. However, given that the majority of employment in BC (over 80 per cent) is full-time jobs, amongst which many are permanent jobs, we have assumed that each opening in the COPS estimates is equivalent to at least one person year of employment.

Labour Demand – Total Openings in the Base Model (found in Chapter 3)

Exclusive of the incremental numbers--that is, without the Games and related projects—BC's provincial employment is expected to grow at an annual average rate of 1.2 per cent between 2003 and 2015, the period of analysis of our study. This period was chosen in keeping with InterVISTAS employment impact figures which are for 2003 to 2015 inclusive. There will be a total employment demand of approximately 913,000 jobs in BC over that time. Most of them are expected to be in service industries. Also, close to half of all occupations require at least some post-secondary education or training.

The estimated total employment in BC in 2003 is 2,001,820 or roughly 2 million (COPS estimate). So the 913,000 jobs of base growth represent 45% of all jobs in BC today. It is a very significant change in the labour force during the period of our review.

Recommendations

3.1 Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply. Develop regional employment projections models for development regions of BC.

3.2 Develop regional employment projections models for development regions of BC.

Incremental Growth in Labour demand (found in Chapter 4)

Summary Table I shows the impact of the 2010 Games in the period under review.

[1] One person-year can be thought of as one Full-Time Equivalent (FTE) person, i.e., one person working full time for a whole year.

Summary Table I Incremental Employment Demand from Games and Percentage Increase of Openings from Base Model (2003 - 2015)

Incremental Growth from Games	Total Job Openings in Base Model	Percentage Increase Above Base Model
76,813	913,285	8.4%

Similar analyses are provided for the three Games-related major projects mentioned above, using initial estimates of overall employment impact directly from the organizations involved.

Total incremental employment demand from the three related projects is approximately 52,000 to 55,000 person years, which represents a 6.0 per cent increase over total job openings generated between 2003 and 2015 without the Games or related projects.

Summary Table II Incremental Employment Demand from VCEC Expansion, Sea-to-Sky Highway Upgrade, and Richmond-Airport-Vancouver Rapid Transit Project, Percentage Increase of Openings from Base Model (2003 - 2015)

Incremental Growth from 3 Projects	Total Job Openings in Base Model	Percentage Increase
52,066 to 54,986	913,285	5.9%

Combining incremental employment demand and total job openings from the base model, the province is expected to experience total labour demand of 1,042,000 to 1,045,000 openings between 2003 and 2015.

Summary Table III Total Labour Demand from Games Related Growth and Openings in Base Model (2003 - 2015)

Incremental Growth from Games and Related Projects	Total Job Openings in Base Model	Total Labour Demand
128,879 to 131,799	913,285	1,042,165 to 1,045,085

Using information available from 2001 Census on the share of self-employment in the labour force by occupation, we can estimate the number of self-employed

for the occupations studied in this report, and thus generate the total self-employment, which is a part of the total employment growth.

Summary Table IV Incremental Growth of Self-Employment from All Projects, 2003 to 2015

	Number of Self-Employed (Person Years)	Percentage of Incremental Employment Growth
2010 Games	10,614	13.8%
VCEC Expansion	4,771	15.6%
Sea-to-Sky Highway Upgrade	1,929	20.4%
RAV Low	2,221	18.6%
RAV High	2,704	18.2%
All Projects	19,535 – 20,017	15.2%

Because of the nature of the construction activities expected from the Games and related projects, the majority of the incremental employment impact is expected to remain in the Lower Mainland.

An exception would be the induced tourism impact. Visitors and tourists drawn to attending the Games in the first place may also be attracted to other parts of the province. Here we summarize the likely distribution of the overall incremental employment impact on tourism by Development Regions of the province.

Summary Table V Tourism Related Incremental Employment Growth by Development Region

Development Region	Share	Estimated Employment in Person Years (2003-2015)
Vancouver Island/Coast	17.9%	9,674
Mainland/Southwest	57.3%	30,943
Thompson/Okanagan	12.9%	6,966
Kootenay	4.1%	2,217
Cariboo	3.4%	1,846
North Coast	1.5%	802
Nechako	0.7%	383
Northeast	2.1%	1,133
British Columbia	100.0%	53,964

Source: BC Stats; RKA

Total Labour Demand—Base + Incremental Growth, (found in Chapter 5)

The Labour demand including base and incremental growth projected by source and by three distinct periods is summarized in Summary Table VI:

Summary Table VI Incremental and Base Growth Openings by Source, 2003-2015

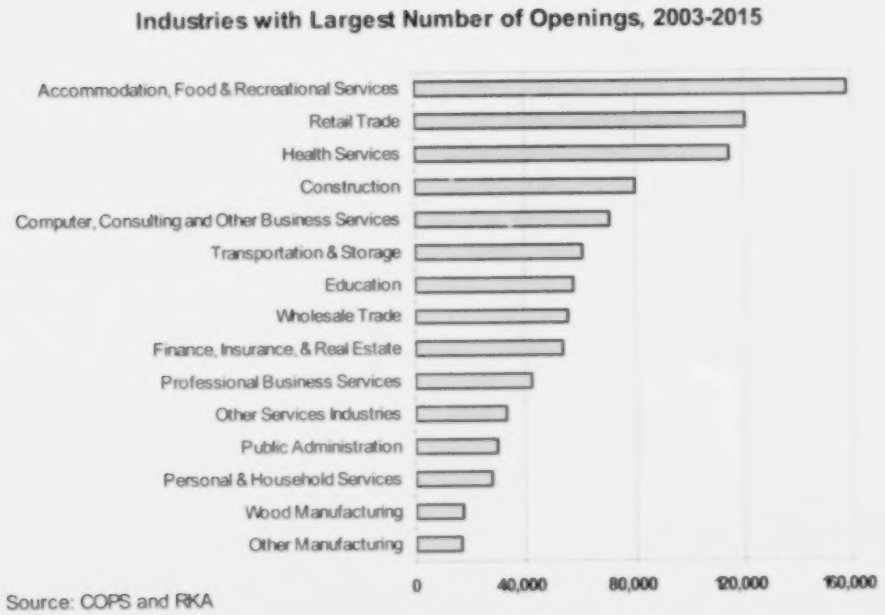
	Pre Games Employment Demand 2003-09	During Games Employment Demand 2010	Post Games Employment Demand 2011-15
Base Openings	510,178	65,506	337,601
Total Games and Projects	59,262 to 62,182	32,882	36,735
2010 GAMES	*26,717*	*30,382*	*19,714*
VCEC Expansion	*11,139*	*2,500*	*17,021*
Sea-to-Sky Highway Upgrade	*9,449*	*0*	*0*
Richmond-Airport-Vancouver Rapid Transit Project	*11,957 to 14,877*	*0*	*0*
Total Base, Games and Projects	569,440 to 572,360	98,388	374,336

Source: RKA

The industries projected to have the largest impact, in terms of numbers of openings, are shown in Summary Figure I (next page).

The occupations with the largest number of openings are shown in Summary Figure II (next page).

Summary Figure I



Source: COPS and RKA

Summary Figure II

Occupations with Largest Number of Openings, 2003-2015
741Motor Vehicle & Transit Drivers
642 Retail Salespersons & Sales Clerks
666 Cleaners
216 Mathematicians / Analysts / Programmers
111Auditors / Accountants / Investment Professionals
624 Chefs & Cooks
414 Sec. / Ele. School Teachers & Counsellors
645 Occ's in Food & Beverage Service
062 Managers in Retail Trade
063 Managers in Food Service & Accommodation
664 Food Counter Attendants & Helpers
647 Childcare & Home Support Workers
122 Administrative & Regulatory Occ's
661Cashiers
143 Finance & Insurance Clerks
0
10,000
20,000
30,000
40,000

Source: COPS and RKA

Incremental employment growth due to the Games and related projects is expected to be about 130,000 person years between 2003 and 2015. Total openings in the base model (i.e. from growth and from attrition) are projected to

be around 913,000 (as seen in Summary Table III). So the total incremental increase in labour represents approximately a 14% increase above total openings in the base scenario.

Putting this into the context of employment growth over the previous 13 years may help to understand from past experience whether such growth in the near future is likely to pose serious challenges to the province's labour market and training system.

The 913,285 projected total openings in the base model between 2003 and 2015 include 354,990 net new openings (openings to meet labour demand from increased economic activities) and 558,295 replacement job openings. For comparison purposes, we looked at the net employment growth available for BC during the previous 13 years from the Labour Force Survey[2]. It is 464,500. Although we do not have information about attrition in these same years, it is almost certain that replacement job openings in the past were smaller than those projected as we face an aging workforce.

Such net growth from the base model, combined with incremental employment growth due to the Games and related projects, would generate a total of approximately 485,000 new openings between 2003 and 2015, excluding replacement jobs. At first glance, this is only slightly more than the employment growth of 464,500 jobs in the previous 13 years, and the labour market should easily accommodate it. However, there are reasons to be concerned. First, such incremental employment demand due to the Games and related projects will be concentrated around the Games year and in a few industries, thus creating a great pressure for these industries to recruit sufficiently early to ensure their needs will be met. Second, incremental employment growth here (130,000) is expressed in person years, each person year being equivalent to one person working full time for a whole year. That means that in reality there are likely going to be many more openings as some jobs will only be part-time or part-year. Third, as we face an increasingly aging workforce, the need to just fill those replacement jobs is going to get more difficult the further we move into the projection period.

For these reasons, it is important to adopt a pro-active and coordinated human resource planning strategy to ensure such demand can be met.

Recommendations

5.1 Using these results, begin planning for labour needs early. Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply, as we have described in the report.

[2] The Labour Force Survey does not provide estimates of replacement jobs.

5.2 Start training programs now. Involve all players, governments, unions, employers, educational institutions, First Nations.

First Nations Supply and Demand (found in Chapter 6)

First Nations have a distinct relationship with the Bid for the Games, and aboriginal people are a key potential source of labour for the Olympics and related projects. As a group whose proportion of the population and role in society is increasing, it is appropriate to focus on First Nations as a distinct part of the potential work force from which the labour supply for these major projects could be drawn. Aboriginal people have understandable expectations of skills development, business growth, employment opportunities (both direct and indirect), new partnership ventures, and greater educational opportunities. The inclusion, representation and participation of the First Nations in the Games and related projects are essential.

The Vancouver 2010 Bid Corporation has signed the "Shared Legacies" agreement with two First Nations, Squamish and Lil'Wat. The objective (in addition to respecting the Nations' presence and protecting title) is to take advantage of economic opportunities.

Included in the agreement are a multi-million dollar Skills and Training Legacy Project (the Skills Legacy) to enhance training and capacity building for the Nations.

Human Resources development plans of the Nations reflect strategies geared to the kinds of opportunities described in the Legacies Agreement, as well as realization of the large number of jobs implicit in the construction activity over the period of the Games, and indirect and induced impacts such as increased tourism, etc.

Another major initiative is an Economic Measures Agreement for the 2010 Olympic Bid and First Nation Training & Employment Initiatives. It creates working partnerships between First Nations, local government and industry, and increases First Nations involvement and capacity in a number of sectors where there are currently occupational gaps. There are other initiatives pertaining to First Nations as well.

In the First Nations HR planning that we have seen, there are good matches with coming opportunities: construction and apprenticeable trades, clerical and office workers, tourism-related training and business skills, environmental workers, as well as training in hospitality, some retail, and healthcare. First Nations plans also include strategies for increasing the number of workers in management in construction, engineering, and in tourism/retail.

Statistics reveal underrepresentation of First Nations in various industries in BC and the Lower mainland. These industries coincide to some degree with the focus of the above-mentioned agreements and First Nations HR plans. They also

coincide very well with areas of opportunity identified earlier in the demand analysis. Shifting the balance into greater labour force share by Aboriginals is clearly needed in a number of significant industries in BC.

We highlight the importance of educational opportunities and career choice to First Nations people for taking advantage of the growth opportunities.

Recommendations

6.1 Ensure full participation and consultation with First Nations in developing and implementing any programs that flow from the Games and related projects, to ensure applicability, and to integrate with extensive and well-developed plans and strategies already in place.

6.2 Conduct a search for examples of successful practices in creating opportunities for First Nations and Indigenous people, in literature about past Games and similar events.

6.3 Continue to facilitate the acquisition of seats for trades training. Some First Nations (e.g. Squamish) have already acquired seats for equipment operators, but with the analysis in 2 above, there would probably be a decision to target other kinds of skills too.

6.4 Determine the needed level and put in place adequate adult education training and career choice assistance for First Nations.

Vancouver's Inner-city Neighbourhoods—Supply and Demand (found in Chapter 7)

The 2010 Bid Corporation has pledged to address actively the concerns of those living in inner-city communities during the planning and implementation of the Games. There is a commitment to ensure that both short and long-term jobs are created for local communities. The following are goals and objectives of the Commitment Statement, which has been adopted by The Vancouver 2010 Bid Corporation and its Member Partners:

- Develop opportunities for local inner-city businesses and artisans to promote their goods and services
- Develop potential procurement opportunities for businesses that employ local residents
- Create training and a continuum of short and long-term employment opportunities for inner-city residents
- Provide reasonable wages and decent working conditions for local workers producing Games related goods and services

Information about the people in the inner-city communities comes from Ference Weicker's report *Phase II of the Economic Capacity Study*. The population of the region is 16,275 (1996 Census figure). It tends to be older, single, male, and

more likely to be renters, compared with the rest of the city. Participation and employment rates are also much lower.

The Vancouver Agreement is a commitment by the federal government, the Province of BC, and the City of Vancouver to support sustainable economic, social and community development in Vancouver with a focus in the Downtown Eastside. The Vancouver Agreement Employment Strategy will tackle the most difficult employment issue—the long term unemployed. This target population is around 2000 (12% of the Downtown Eastside's population). The goal is for up to 700 to become employed over 3 years (2003-2006) – as opposed to fewer than 100 per year now. Many have deep rooted barriers that it would take years to overcome.

Recommendations

7.1 Use the demand information that we have presented in Chapters 3 through 5, applying it to develop a continuum of programs and policies to facilitate preparing the unemployed (including the long-term unemployed) to be able to access employment opportunities.

7.2 Build upon the Ference Weicker recommendation for work following this study: "Prepare an employment strategy for residents of the inner-city neighbourhoods," including a more detailed look at the employability characteristics of the neighbourhoods' populations, either as a group or individually, in light of the detailed analysis of demand/supply.

2010 Games Volunteers (found in Chapter 8)

We are considering Olympic Volunteers as another category of labour demand for the 2010 Games. Besides the demand for paid labour, a very large impact comes from the volunteering effort. Thousands give time and effort that matches those devoted to a paid job. In past Olympic host cities and areas, the experience has been as interesting and formative as a job, and has left a lasting legacy.

Besides intrinsic rewards another benefit of volunteering is gaining experience that can be career-related. The career-related benefits are significant especially when multiplied by the thousands who volunteer.

We estimated a minimum count for Vancouver-Whistler of 25,000–30,000 volunteers. We learned that the Vancouver 2010 Bid Corporation has estimated 21,500 volunteers, roughly 17,800 for the Olympic Games and 3,700 for the Paralympics, with overlap difficult to predict.

Large events like the Olympic Games attract volunteers at the highest level of competence. Medical services volunteers have included physicians, dentists, nurses and paramedics. Managerial and other kinds of skilled work and some

nearly "unskilled" jobs are also carried out by volunteers. Some categories of workers that are needed in larger numbers are:

- Workers in transportation: driving, coordinating, dispatching, directing traffic
- food service workers
- clerical and administrative workers
- assistants in medical services
- hosts, guides and information providers
- educators and public speakers
- people skilled in communicating, coordinating, organizing, project planning and control, and similar middle-management functions

The issues that require attention are matching of skills with volunteer positions, and recognition of the volunteer jobs as a valuable resource to be allocated amongst the communities in the local area.

Skill development through experience and training, and networking opportunities, are benefits that accrue to Games volunteers.

Recommendations

8.1 Recognize the crucial strategic importance of volunteers, and recognize volunteer jobs as a valuable resource to be allocated amongst communities, much in the way the paid jobs are.

8.2 Learn from some key strategies from other Games:

- the strategy of mixing volunteers at all levels with highly qualified leaders.
- the strategy of minimizing the distinction between paid and unpaid staff, with a view to maximizing responsibility and accountability of volunteers (but keeping in mind the need to observe the distinction that is important to unions in certain sectors).

8.3 Ensure proper leadership, instruction, support and recognition for volunteers.

8.4 Use the Salt Lake City Transfer of Knowledge CD's (available in Bid Corporation library) when detailed information is needed on staffing, jobs, work descriptions. (This source is the most complete, detailed, and compact of any on Olympic Winter Games Human Resources.)

Labour Supply (found in Chapter 9)

Since this study is chiefly about the demand aspects of the major projects, our research and the majority of our analysis have focused on demand. Our comments on supply are more general in nature. Subsequent study of the labour supply issues will be sponsored by the Human Resources Planning Committee, towards the objective of an overall strategic plan and component strategies.

The main supply options for meeting the labour demand are:

- Drawing on an existing labour force, including unemployed people, new entrants to the labour force, qualified people who choose to return to work (perhaps because of the major projects), etc.
- Drawing on existing workers, but via lateral moves (upgrading skills or re-training workers for new skills to work in new areas).
- Training people (this can include formal or institutional training, and also learning that takes place in the job situation).
- Recognizing credentials (e.g. workers with foreign credentials or experience)
- Drawing upon migration, either from the rest of Canada, or foreign workers from other countries.

The provincial government is doing important work in addressing supply issues in BC with a view to developing a human resources strategy for the province. The Ministry of Skills Development and Labour's *Summary Report* on a series of Skill Shortage meetings with key industry sectors includes information on Construction, Technology, Tourism, Transportation and Small Business.

Key Outcomes from the Ministry of Skills Development and Labour's Skill Shortage Meetings include: some skill shortages identified; current skills shortages not generally identified as a critical area of concern; significant concern about looming skills shortages particularly given BC's demographics; the need for timely redesign of the industrial apprenticeship training system; the identification of leadership and managerial/supervisory skill shortages as a critical issue; the importance of the role of the private sector in developing and providing education for their employees; the role government has in facilitating the coming together of various parties to address the skill shortages challenges.

There needs to be a framework for apprenticeship programs that will attract and retain to completion sufficient numbers of workers to meet current and future growth as well as replace workers who retire or leave a trade. Greater flexibility and modularization may help.

Options for adult education for high school completion are also necessary.

A rising number of occupations may have difficulties with supply. The strategies that have been devised include enhancing compensation, conditions of work, etc., and also the "image" of some occupations, particularly a perceived lack of career path.

A theme that emerges from the Ministry of Skills Development and Labour's work (above) and our own key informant interviews is that the time of labour surplus in BC is slipping away. We are possibly facing a tighter labour market than anticipated with the higher retirement level (brought on by demographics) as we reach 2010—exacerbated if other major projects are occurring here or even outside BC.

The need for planning, preparation and coordination is very high, to meet the challenge of supplying labour demand. Adding the Games and related projects to the mix, while it brings economic opportunity, also increases the challenge.

A watching brief should be kept for competing projects in other parts of Canada, which could draw BC workers away.

Many key informants have said that once major projects are started or announced, it will trigger an influx of needed workers to BC. However, we looked at migration patterns for Expo 86, and conclude that its incremental employment demand was most likely met by intraprovincial migration as opposed to a large influx of migration from outside of BC. That possibility has implications for labour supply in areas of the province outside the Lower Mainland.

Recommendations

9.1 Conduct a comprehensive labour supply analysis, to identify the available supply for the occupations showing the highest incremental labour demand, but also for the "base growth" of Chapter 3. In addition, examine key occupations which show high average annual growth rates (even if actual numbers are small). A more detailed description of the work is given in Chapter 9 Labour Supply.

9.2 Put in place a framework for apprenticeship programs that will attract and retain to completion sufficient numbers of workers to meet current and future growth as well as replace workers who retire or leave a trade.

9.3 Use the opportunity of the Olympics and related projects to promote skilled trades as a career and attract people into the skilled trades. — actions for both government and industry. (Construction, other sectors). — From Key Informants, Multiple Sources

9.4 Ensure that maximum efforts are made to "share the wealth"/promote opportunities for areas outside the Lower Mainland. — From Key Informants, Government and Organizations

9.5 Keep a watching brief for major projects in other parts of Canada and elsewhere between now and 2010, which will compete with the BC projects for labour, not only making it more difficult for BC to attract workers from outside the province, but possibly drawing BC workers away.

Potential Demand-Supply Gaps (found in Chapter 10)

Subsequent stages in the Committee's work will focus directly on the supply side, along with gaps, for a more robust analysis which can lead to strategies to address them in a long term Human Resources Plan.

Some areas of very large growth in our demand analysis, suggest a potential for gaps. Very few of the new openings will be for unskilled workers at entry level

(116,696 or 11 percent). The overwhelming majority of these are in Elemental Sales and Service Occupations, which include: Cashiers, Other Sales and Related Occupations, Food Counter Attendants and Related, Security Guards, etc.

The interviews done in 2002 by the BC Ministry of Skills Development and Labour, and our discussions with key informants highlight a number of occupations for which gaps may be predicted. These reinforce the need for training and skill development, the need for basic education, the need to target groups not previously considered, or who may not have previously considered certain career paths (employer side), the need for career counselling and awareness (worker side), an emphasis on entrepreneurial opportunities, and alternate views of "work" or "employment" as opposed to "having a job". Another theme is that of incrementality. Realistic models for addressing Demand-Supply gaps are not all-at-once but incremental.

Some industries are further ahead than others in human resource planning, looking ahead to their skill needs and planning strategies. The retail and hospitality sectors for example recognize the need to showcase career path potential. There are realizations that older workers, Aboriginals, and others who may not have been first thought of when there was a ready supply of part-time student workers, can be much sought-after groups to fill supply gaps.

Various risks exist if planning does not take place to overcome barriers and BC encounters shortages of skilled people—risks such as increasing labour costs or critical positions going unfilled. An industry's labour supply may be affected by changes in other industries too (the retail sector, for example, could lose entry-level workers to a booming tourism sector). A particular issue is the impact of a tight labour market in one region (e.g. the Lower Mainland) on others.

The potential for labour shortages in certain industries and occupations exists, although many observers feel that the situation is manageable through migration or other means. However, this view may be coloured by the current situation in the BC labour market. The Games and related projects, as well as general economic conditions can increase the pressures on the labour market as will any other major projects in BC or elsewhere.

Therefore, it is important to take steps now to do the planning, to establish the training structures and to inform workers and potential workers about opportunities for learning and employment.

Recommendations

10.1 Ensure planning and consultation across the economy towards maximizing the efficiency of labour force transactions, and for leveraging programs that bring different parts of the labour market into planning/analyzing mode. (The Provincial Government's Human Resource Strategy initiative is one example, as is the Federal Government's Industrial Adjustment Strategy.)

10.2 Take measures to facilitate the recognition of credentials of qualified immigrant workers and others who are already in BC, and to ensure that licensing bodies are using criteria that are sufficiently flexible.

10.3 Take steps now to establish needed training structures and to inform workers and potential workers about opportunities for learning and employment.

Conclusion

There is a need to prepare for the degree of change in the labour market we are soon going to experience, change unlike that we are accustomed to in recent years. The recommendations throughout the Executive Summary are based upon RKA's detailed analysis of the relevant literature, the statistical data available and interviews with key informants. We feel that adopting and implementing them will enable British Columbia and its present and future workers to maximize benefits from the 2010 Olympic Games and related projects.

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Chapter 1 Introduction

The 2010 Olympics will bring to British Columbia an economic impact of 3.3 billion dollars[3] and 77,000 person-years of employment. In addition, the Olympics may encourage or hasten decisions about other large-scale public projects. The Vancouver Convention Centre (VCEC) will be built in time to complement the Olympics; the Sea-to-Sky Highway upgrade will go ahead in time to facilitate Vancouver-Whistler travel; and the Richmond-Airport-Vancouver transit link will be ready in time for the Games. The combined impact of these related projects will be around 54,000 person years of employment during the period 2003 to 2015. Together with the Olympic Games, the impact will be around 131,000 person years in the same period, much of it from public spending going to BC workers and companies.

With major events such as these in mind, a committee of business, community and government leaders has been working since 2002 to build a 2010 Economic Opportunity Strategy to maximize the economic returns locally, provincially and nationally from hosting the 2010 Games, and at the same time enhance the Bid. This Strategy will support the earliest possible planning for success of the Games and related projects, and will maximize the economic returns locally, provincially and nationally from hosting the 2010 Games. The vision of the Strategy will be to extend new community economic development and business benefits beyond the host and corridor communities for the 2010 Games. The work on the Strategy will also support the Bid's Sustainability Framework (identifying environmental, social and economic objectives). The Economic Opportunity Strategy's values are inclusiveness, constant improvement and the pursuit of excellence.

Parts of the Strategy include Procurement, Trade and Investment, Tourism and Sport, and Human Resource Planning. The Human Resource Planning Project, 6 months long, will result in a strategic plan to maximize the employment and skill development opportunities that the 2010 Games will bring to BC.

The 2010 Winter Games Human Resources Planning Committee[4] is jointly sponsored and created by the Province of British Columbia, via the Olympic Bid Secretariat, and the Government of Canada, through Human Resources Development Canada (HRDC), BC/Yukon Region. This committee's work is to create an employment, skill development and volunteer training component of the overall Economic Opportunities Strategy for the 2010 Winter Games. It aims to do so through an active partnership with the key communities and sectors involved.

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[3] Total GDP (Gross Domestic Product), *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: an Update*, InterVISTAS Consulting Inc. (2002), p.73.

[4] The Committee activities and projects are jointly funded under terms of an Industrial Adjustment Agreement by HRDC, BC/Yukon Region and the 2010 Legacies Now non-profit society.

A foundation for this work is the development of a 2010 Winter Games Labour Demand Analysis including employment and training impacts of the construction and operation of the VCEC, the Sea-to-Sky Highway upgrade, and the Richmond-Airport-Vancouver transit link.

Subsequent work to address the labour supply issues, and further projects and phases, will be sponsored by the Human Resources Planning Committee, leading to the completion of an overall strategic plan and component strategies. The planned sequence is from consideration of demand to supply, then to identified gaps and imbalances, and to strategies to address them, with other strategies to maximize employment and skill development opportunities making up a long term Human Resources Plan.

In February 2003 Roslyn Kunin & Associates, Inc. (RKA) was contracted to undertake the 2010 Winter Games Labour Demand Analysis. RKA's terms of reference included a comprehensive analysis and "disaggregation" (breaking out from aggregates or totals) of the estimated labour demand resulting from the 2010 Games and related projects. As well, to the extent possible, RKA was asked for other outputs—at a general or order of magnitude level—related to labour supply, Games volunteers, training, and demand-supply gaps. This report is the result of that work.

Building on the assumptions and aggregate projections provided by InterVISTAS Consulting Inc.'s medium-high estimate[5], the Ministry of Competition, Science and Enterprise, the BC Ministry of Transportation and Highways, and the Richmond-Airport-Vancouver Rapid Transit Project respectively, the report provides disaggregated estimates of employment by industry, by occupation and by region for the Olympics themselves as well as for the Vancouver Convention Centre, Sea-to-Sky Highway Upgrade, and the construction of Richmond-Airport-Vancouver Rapid Transit system.

The progression of the analysis can be represented as a sum of several components (beginning on next page):

[5] InterVISTAS' four estimates "were projected for four scenarios reflecting different levels of success in attracting visitors to British Columbia before, during and after the Games." -- *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: An Update*, InterVISTAS Consulting Inc. (2002), p. xi.

Base Openings
Including
New Jobs due to Economic Growth
And Replacement Jobs
(source: COPS – see Methodology page 8)

+

Incremental Growth
Due to
2010 Games, VCEC expansion,
Sea-to-Sky Highway upgrade,
Richmond-Airport-Vancouver Rapid Transit Project (Sources of Data: see Methodology Page 6)

=

Total Growth or Increase of Labour Demand

These components appear as Chapters 3, 4 and 5 of this study.

The report includes a quantitative analysis and estimate of the incremental employment impacts, including:

- Differentiating between growth from the 2010 Games and growth from the related projects.
- Differentiating between base growth (without the Games and related projects) and incremental growth.
- Estimating all annual base and incremental growth by industry sector (Standard Industrial Classification).
- Estimating all annual base and incremental growth by occupational categories (National Occupational Classification), including self-employment, and identifying important common skill sets/clusters.
- Estimating all annual base and incremental growth by region of the province and by Games and post-Games periods.

The report provides an overview estimate of the demand for volunteer workers needed for the Games and corresponding skill, training and recruitment implications. It also identifies to the degree possible, the training implications and

needs resulting from the incremental employment growth and volunteer requirements.

It provides some analysis on intraprovincial and inter-provincial migration for the period 2003-2015, with reference to migration around the period of Expo 86 in British Columbia.

One of the goals of the 2010 Winter Games Human Resources Planning Committee is to work towards maximizing opportunities outside of the Lower Mainland. The process for gathering information for this report has taken into consideration wherever possible the impacts and possible outcomes for areas outside of those where the Games and major projects will take place. The immediate impacts may be most apparent in those areas, but we endeavoured to see how the impacts may be far-reaching, and what implications they may have for other regions and the "heartland" of the province. Later work by the Committee will be able to build on this information to lead towards strategies to maximize opportunities for those areas.

Labour demand is the focus of the report, set out in the detailed estimates described above. In addition, it contains some limited analyses of supply, gaps and strategies to the extent possible at this stage. Subsequent Committee projects will investigate these analyses in more depth. In this report there is some general comment on the potential for demand-supply gaps or mismatches, and there is included a series of recommendations to the Committee on such things as next steps, strategies for addressing gaps, and the need for further research, analysis, consultation and other activities.

Chapter 2 Methodology

In this Chapter, we will describe the source of data and basic models used to produce the estimates which lay the foundation of our analysis throughout the report. We will also describe the research approach we adopted to piece together all information and data to produce this report. To start with, we will describe the objectives of this study.

Objectives of Study

If selected as the host country and city in July 2003, the Vancouver/Whistler 2010 Winter Games will have a tremendous economic impact on British Columbia and its citizens. This has been documented in two studies recently completed: *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates* (BC Trade Investment Office, January 2002), and *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: an Update* (InterVISTAS Consulting Inc., October 2002).

The Olympic Bid Secretariat is developing an Economic Opportunity Strategy to maximize the returns from hosting the 2010 Winter Olympics in collaboration with the federal government and other key agencies. A part of this strategy is to encourage and enable sectors and communities to create their own economic opportunity strategies that will link directly with the broader strategy.

There is an immediate need to develop a 2010 Winter Games Labour Demand Analysis to provide a foundation for the creation of the labour, skill development and volunteer training component of the overall economic opportunities strategy. This will enable identification of demand/supply gaps, training implications and development of plans and strategies to address the expected incremental demand. This analysis will also include employment and training impacts of three other major infrastructure projects that will complement the 2010 Winter Games: the construction and operation of the Vancouver Convention and Exhibition Centre expansion, the Sea-to-Sky Highway upgrade project, and the Richmond-Airport-Vancouver Rapid Transit project.

Therefore, the objective of our current study is to break down the InterVISTAS and the Ministry of Competition, Science and Enterprise (BC Trade Investment Office) employment impact numbers, and other employment impact numbers produced by BC Stats, as much as possible in terms of sectoral, occupational, regional, temporal and other factors. The incremental demand analysis also needs to be put into the context of expected employment growth in the province's labour market without the Games and related projects. This will help to identify areas of challenges in labour demand, gaps between demand and supply of labour, and strategies to address these challenges. The period of analysis for our

study was chosen in keeping with InterVISTAS employment impact figures which are for 2003 to 2015 inclusive.

In the following sections, we will describe the sources of data we will utilize for labour demand analysis in this study and the economic models used to produce them.

Source of Data

As discussed in the previous section, two studies published recently – *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates* (BC Trade Investment Office, January 2002), and *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: An Update* (InterVISTAS Consulting Inc., October 2002) – lay the groundwork of labour demand analysis in our current study. In these reports, incremental employment impacts on the province from the 2010 Winter Olympic Games (the Games) and the construction and operation of the expanded Vancouver Convention and Exhibition Centre were estimated. Such impacts include the direct, indirect, and induced employment impacts from each of the projects.

Estimates of incremental employment growth from the above two studies were in aggregate form. In order to make them useful for the purposes of our analysis in this report, we have requested BC Stats to apply estimates of direct employment impact and to derive indirect and induced impacts by industry using the BC Input-Output Model.

For the Sea-to-Sky Highway upgrade project, we have been provided a spreadsheet containing direct person year estimates during the years of the construction project by major occupational groups, from the BC Ministry of Transportation and Highways.

For the Richmond-Airport-Vancouver Rapid Transit project, we have been provided a Resource Summary Statement and a Cash Flow Statement by Richmond-Airport-Vancouver Rapid Transit Project. The Resource Summary Statement contains total costs over the entire construction period, broken down into categories like Labour, Materials, Equipment, etc. Estimates of the manpower required (in person-years) and the local content of materials and equipment were also provided.

In addition to direct employment impacts brought by the Sea-to-Sky Highway upgrade and Richmond-Airport-Vancouver Rapid Transit projects, we recognize their "spin-off" effects on other industries that supply materials and services to those directly impacted, as well as their effect of increasing household income levels throughout the economy. To do this, we have also requested BC Stats to calculate indirect and induced employment impacts by industry using the BC Input-Output Model.[6]

[6] The work by BC Stats is found in three separate reports: *BC Input-Output Analysis for Vancouver*

Once total incremental employment growth has been derived, we will be able to compare and analyze such incremental growth with total job openings expected to materialize in BC's labour market without the occurrence of the Games or related projects (i.e., total openings in the base model). We have relied upon employment projections by industry and by occupation available from the Canadian Occupational Projection System, or COPS, model.

The provincial government has been doing some important work in addressing supply issues in BC with a view to developing a human resources strategy for the province that would support economic growth. The Ministry of Skills Development and Labour's work on skill shortages has been an important input to our report.

Other sources of data we have utilized in the report are from intensive literature review (industry, government, education and training, and other reports, studies, analyses, and other documents), and other statistical analyses and databases. In addition, we benefited greatly from the specific, timely and relevant information given by the key informant interviewees named in Appendix A. Their input is found throughout the sections of this report.

Unfortunately, there are no readily available regional employment projections models for the province. The topic is important and further work to develop it in the future is suggested.

In the next two sections, we briefly describe the two economic models applied during this study: the BC Input-Output Model, and the Canadian Occupational Projection System model.

BC Input-Output Model

Input-output analysis is based on statistical information about the flow of goods and services among various sectors of the economy. This information, presented in the form of tables, provides a comprehensive and detailed representation of the economy for a given year. An input-output model is essentially a database showing the relationship between commodity usage and industry output. It consists of three components:

- A table showing which commodities – both goods and services – are consumed by each industry in the process of production (the input matrix);
- A table showing which commodities are produced by each industry (the output matrix); and
- A table showing which commodities are available for consumption by final users (the final demand matrix).

Convention Centre Expansion, BC Stats, revised in October 2000; *BC Industry Employment Estimates for the Proposed 2010 Olympic Games and Construction of Sea-to-Sky Highway*, by Garry Horne of BC Stats, March 2003; and *BC Industry Employment Estimates for the Proposed Richmond-Airport-Vancouver Rapid Transit Project*, by Garry Horne of BC Stats, March 2003.

These data are combined into a single model of the economy which can be solved to determine how much additional production is generated by a change in the demand for one or more commodities or by a change in the output of an industry.

BC Stats has maintained a provincial Input-Output Model (BCIOM) for more than ten years. The most recent available BCIOM can be viewed as a snapshot of the BC economy, taken in 1996. It is derived from the 1996 Interprovincial Input-Output tables developed by Statistics Canada and includes details on 679 commodities, 243 industries, 180 "final demand" categories, and a set of computer algorithms to do the calculations required for the solution of the model. It can be used to predict how an increase or a decrease in demand for the products of one industry will have an impact on other industries and therefore on the entire economy.

The model has been used by BC Stats for hundreds of studies, including the impacts of Free Trade, the Vancouver Island Gas Pipeline, the Kemano Completion Project, and land use planning studies throughout the province.

Canadian Occupational Projection System

The Canadian Occupational Projection System (COPS) is developed to forecast the state of the economy by the Human Resources Development Canada (HRDC) in close consultation with partners in provincial governments. In BC, the Ministry of Advanced Education, Training and Technology is the provincial partner. COPS provides long-term projections of employment demand by industry for BC based on Labour Force Survey historical data from Statistics Canada combined in a complex national and provincial forecasting model.

The COPS model includes a variable occupational coefficient matrix which reflects changes over time in the mix of occupations within an industry group. These vary due to technological and organizational shifts for a known historical period with a projection for the future. Occupational projections are developed by multiplying industry employment forecasts by this variable coefficient matrix.

The particular forecast scenario used to derive industry and occupational employment demand for the purposes of this report is the "2003 Unique Reference Scenario" of the COPS demand Model. In this forecast, overall employment demand for BC is projected to grow on average at 1.4 per cent per year between 2001 and 2011.

For the purpose of our analysis in this report, the period of analysis falls between 2003 and 2015 inclusive. Given that, we have assumed that employment demand will grow at the same rate as that of the last four years (2008 to 2011) of the COPS model.

Primary Research

In addition to secondary research, we have conducted qualitative and primary research activities to add value to this study. Specifically, we have conducted telephone and in-person interviews of members of the 2010 Winter Games Human Resources Planning Committee (the Committee) and key industry and stakeholder representatives. We incorporate their comments and recommendations throughout our analysis in the report. A list of Key Informants is provided in Appendix A.

Unit of Measurement

Finally, we note that our unit of measurement throughout the report is person years of employment.[7] Such were the terms used in the two economic impact studies just mentioned, as well as impact estimates for other major projects related to the Games. We recognize the fact that employment estimates in the COPS include all arrangements of employment: full-time, part-time, permanent, contract, or casual work. Therefore they are not equivalent to person years. However, given that the majority of employment in BC (over 80 per cent) is full-time jobs, amongst which many are permanent jobs, we have assumed that each opening in the COPS estimates is equivalent to at least one person year of employment.

[7] One person-year can be thought of as one Full-Time Equivalent (FTE) person, i.e., one person working full time for a whole year.

Chapter 3 Labour Demand—Total Openings in the Base Model

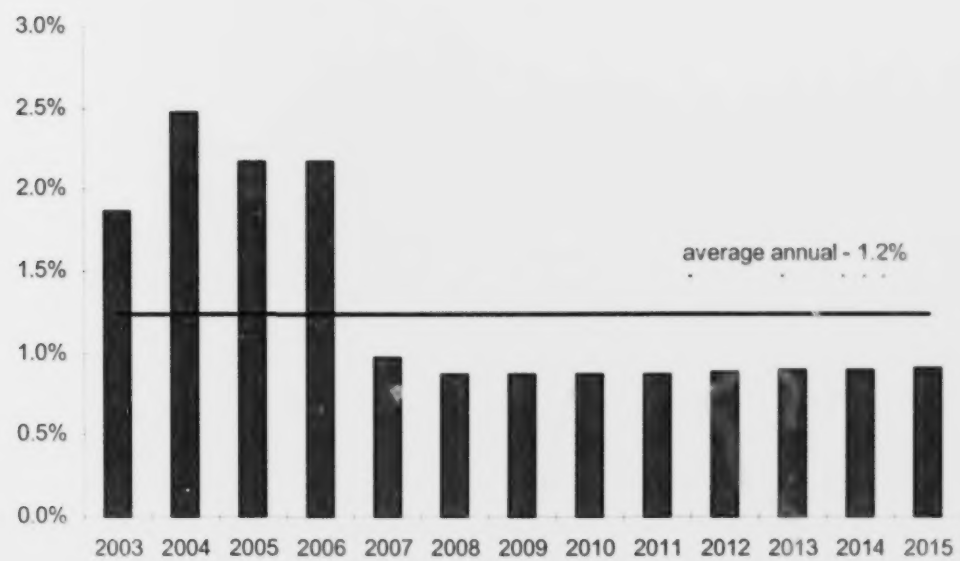
This study is about the potential employment impact on the provincial economy related to the 2010 Olympic Games and other major infrastructure projects during the 2003-2015 period. However, without the Games and Games-related economic activity, the provincial economy would carry on in ways that are predictable by the methods that economists continually apply to project future economic change.

The ordinary growth that may be foreseen in this way is called "Base Growth" as opposed to the "Incremental Growth" that is the main subject of this study, i.e. growth due to the major projects.

Projections of base growth are well-established because the province's ongoing economic performance is the focus of considerable attention by economists. In this Chapter, we use these projections to provide a brief description of employment outlook in the province in the absence of the Games and other related projects. This provides a basis for the discussion of incremental labour demand later in the report.

Figure 1

Projected Employment Growth Rates in BC, Without 2010 Games or Related Projects, 2003 to 2015



Source: COPS and RKA

Later in the report we will also discuss briefly the employment growth from the previous thirteen years. This comparison will allow for understanding of the projected employment growth in the context of what has happened in the past.

Exclusive of the incremental numbers—that is, without the Games and related projects—BC's provincial employment is expected to grow at an annual average rate of 1.2 per cent between 2003 and 2015, which is the period of analysis of our current study. This rate has been derived using the forecasts from the Canadian Occupational Projections System (COPS) from 2001 to 2011, and RKA's assumption that employment growth from 2012 to 2015 will be the same as the average growth rates in the last four years of the COPS projection.

Figure 1 shows annual employment growth rates for the province between 2003 and 2015. Employment growth is expected to be relatively strong in 2003 through 2007, but is expected to be modest from 2007 onwards.

Employment opportunities generated from such growth only capture one portion of the total job openings in the economy every year. Even if there is no employment growth, there will still be job openings due to the need to fill gaps from people leaving the labour force (for example, to retire or to pursue post-secondary education and training). Such job openings are replacement job openings, and are also captured by the COPS model. In this Chapter, total job openings are those from both employment growth and replacement needs.[8]

3.1 Total Openings by Industry

Labour demand reflects the economic conditions of an economy. When an economy is booming, businesses generally require more labour to meet production demands. This puts pressure on wage rates, driving them up, which works to slow the growth in the number of openings. It also creates pressure on educational and training services. On the other hand, increased labour demand may lead to increased labour force participation, or may lead to migration into the local economy, which could be beneficial to the local economy.

Provincial employment is expected to grow at an annual average rate of 1.2 per cent between 2003 and 2015, according to forecasts from the Canadian Occupational Projections System (COPS), and RKA's assumption that employment growth from 2012 to 2015 is expected to be the same as the average growth rates in the last four years of the COPS projection. However, there is much variation in employment growth rates amongst industries, which is shown in Table 1. Also shown in Table 1 are total openings between 2003 and 2015.

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[8] It is worth mentioning that in the COPS model, "jobs" or "openings" are treated the same way and the terms used interchangeably. They can be full-time or part-time jobs, contract or casual or on-call jobs, or self-employment. However, given that over 80 per cent of employment in BC is full time (from the Labour Force Survey), amongst which many are permanent jobs, we have assumed in this report that each opening in the COPS model leads to at least one person year of employment.

Table 1 Current Employment, Employment Growth Rates and Total Openings by Industry in Base Model

Industry	Estimated Employed in 2003	Average Annual Growth Rates 2003-15	Total Openings 2003 To 2015
Agriculture	33,147	-0.5%	7,854
Fishing & Trapping	8,225	-0.2%	1,886
Logging and Forestry	23,554	0.3%	7,111
Mining, Quarries & Sand Pits	7,026	0.3%	2,469
Crude Petroleum, Gas Mining & Coal	1,189	1.0%	498
Mining Services	4,449	-0.3%	864
Food Products & Beverages	21,686	0.3%	6,731
Rubber, Plastics & Chemicals	12,239	-0.1%	3,162
Pulp and Paper, Paper Products	15,155	2.0%	8,652
Wood	50,837	0.6%	16,620
Printing and Publishing	20,193	0.8%	7,719
Manufactured Mineral Products	14,149	0.6%	5,532
Metal Fabrication & Machinery, ex. electrical	19,354	0.1%	6,042
Motor Vehicles, Trailers & Parts	4,566	-1.2%	501
Other Transportation Equipment	7,540	3.7%	6,596
Electrical & Electronic Products	9,490	0.8%	3,723
Other Manufacturing	24,500	0.7%	9,302
Construction	127,495	1.4%	61,843
Transportation & Storage	96,950	1.7%	53,471
Communication	42,167	0.0%	10,781
Utilities	14,809	1.6%	7,617
Wholesale Trade	101,506	1.5%	51,233
Retail Trade	274,402	1.0%	109,961
Finance, Insurance, & Real Estate	109,579	1.0%	48,633
Advertising	12,539	1.2%	5,520
Professional Business Services	73,525	1.3%	34,547
Computer, Consulting and Other Business Services	90,679	3.0%	67,132
Public Administration	90,306	0.3%	29,301
Education	135,466	0.2%	57,175
Health Services	200,131	1.8%	113,898
Accommodation, Food & Recreational Services	229,854	1.9%	110,355
Personal & Household Services	51,569	1.6%	26,345
Other Services Industries	73,545	0.8%	30,213
All	2,001,820	1.2%	913,285

Source: COPS and RKA

Table 2 shows the 15 industries where employment growth rates are expected to be the highest between 2003 and 2015. Also shown in the Table are total openings in each of these industries.

Most of the industries which are expected to grow faster than average are service industries, as can be seen in Table 2. This shows the growing importance of service industries in BC's economy. Only Other Transportation Equipment, and the Pulp and Paper, Paper Products, Utilities, and Construction industries are goods-producing industries that are expected to grow faster than average.

Table 2 Industries with Fastest Employment Growth in BC, Base Model, 2003-2015

Industry	Average Annual Growth Rate	Total Openings
Other Transportation Equipment	3.7%	6,596
Computer, Consulting and Other Business Services	3.0%	67,132
Pulp and Paper, Paper Products	2.0%	8,652
Accommodation, Food & Recreational Services	1.9%	110,355
Health Services	1.8%	113,898
Transportation & Storage	1.7%	53,471
Personal & Household Services	1.6%	26,345
Utilities	1.6%	7,617
Wholesale Trade	1.5%	51,233
Construction	1.4%	61,843
Professional Business Services	1.3%	34,547
Advertising	1.2%	5,520
Finance, Insurance, & Real Estate	1.0%	48,633
Crude Petroleum, Gas Mining & Coal	1.0%	498
Retail	1.0%	109,961
All Industries	1.2%	913,285

Source: COPS and RKA

The majority of the industries that are expected to generate the largest number of jobs between 2003 and 2015 are also service industries. In fact, of all industries identified in Table 3, only the Wood (manufacturing) industry is a goods-producing industry. This reinforces the significance of service-producing industries in the BC economy.

Table 3 Industries with Largest Number of Total Openings in the Base Model for BC, 2003 to 2015

Industry	Total Openings
Health Services	113,898
Accommodation, Food & Recreational Services	110,355
Retail Trade	109,961
Computer, Consulting and Other Business Services	67,132

Industry	Total Openings
Construction	61,843
Education	57,175
Transportation & Storage	53,471
Wholesale Trade	51,233
Finance, Insurance, & Real Estate	48,633
Professional Business Services	34,547
Other Services Industries	30,213
Public Administration	29,301
Personal & Household Services	26,345
Wood	16,620
Communication	10,781
All Industries	913,285

Source: COPS and RKA

3.2 Total Openings by Occupation

A different perspective for looking at potential employment opportunities in the provincial economy is from the occupation side. Occupational analysis provides a glimpse of the skill types and skill levels of those occupations in high demand and those in low demand.

In our detailed occupation analysis in the report, we produce estimates of employment demand by occupation using the 3-digit National Occupation Classification (NOC) groupings. There are altogether 139 groupings. Here in Table 4 we present the number of total openings in the base model by 2-digit NOC groupings for the period 2003 to 2015. In this Table we also highlight some examples of 3-digit NOC occupations from within their 2-digit groups that are expected to provide the most openings.

Table 4 Current Employment with Total Openings in the Base Model by 2-Digit NOC Groupings, and Selected Occupations with Most Openings, 2003 to 2015

Primary Groups	Estimated Employed in 2003	Openings 2003-15	Largest Growth within Primary Group (Selected Occupations)
0 Management Occupations	186,706	95,756	***062*** *Retail Managers* (22,206) ***063*** *Food Service and Accommodation Managers* (18,019)
11 Professional Occupations In Business And Finance	56,973	36,284	***111*** *Auditors/Accountants/Investment Professionals* (25,661)
12 Skilled Administrative And Business Occupations	115,969	56,486	All are large, from ***121*** *Clerical Supervisors* (10,481) to ***122*** *Administrative and Regulatory Occupations* (19,159)
14 Clerical Occupations	174,506	66,423	***141*** *Clerical, General Office Skills* (12,108) ***143*** *Finance & Insurance Clerks* (17,731) ***147*** *Recording / Scheduling / Distributing* (11,298)
21 Professional Occupations In Natural And Applied Sciences	77,784	45,046	***216*** *Mathematicians / Analysts / Programmers* (28,062)

Primary Groups	Estimated Employed in 2003	Open-ings 2003-15	Largest Growth within Primary Group (Selected Occupations)
22 Technical Occupations Related To Natural And Applied Sciences	50,117	25,012	***224*** *Electronics/Electrical Engineering Technicians* (10,182)
31 Professional Occupations In Health	51,768	28,627	***315*** *Nurse Supervisors & Registered Nurses* (17,094)
32 Technical And Skilled Occupations In Health	26,019	13,266	
34 Assisting Occupations In Support Of Health Services	28,584	16,388	This major group is only one large group ***341*** *Assisting Occupations in Health Services* (16,388)
41 Professional Occupations In Social Science, Education, Government Services And Religion	118,079	58,101	***414*** *School Teachers & Counsellors* (25,176)
42 Paraprofessional Occupations In Law, Social Services, Education And Religion	22,953	10,510	This major group is only one large group ***421*** *Paralegals/Social Workers/etc.* (10,510)
51 Professional Occupations In Art And Culture	26,866	11,942	
52 Technical And Skilled Occupations In Art, Culture, Recreation And Sport	33,981	16,267	
62 Skilled Sales And Service Occupations	142,371	67,039	***621*** *Sales & Service Supervisors* (15,970) ***624*** *Chefs & Cooks* (18,632)
64 Intermediate Sales And Service Occupations	222,190	91,993	***641*** *Sales Reps, Wholesale* (14,335) ***642*** *Retail Salespersons & Sales Clerks* (30,128) ***645*** *Occupations in Food & Beverage Service* (16,213) ***647*** *Childcare & Home Support Workers* (21,227)
66 Elemental Sales And Service Occupations	199,998	82,468	***661*** *Cashiers* (16,906) ***662*** *Other Sales and Related* (10,158) ***664*** *Food Counter Attendants & Helpers* (16,055) ***666*** *Cleaners* (26,798)
72-73 Trades And Skilled Transport And Equipment Operators	166,353	76,137	***721*** *Contractors & Supervisors, Trades* (13,083) ***731*** *Heavy Duty Mechanics* (9,765), other individual trades at high levels but below 10,000
74 Intermediate Occupations In Transport, Equipment Operation, Installation And Maintenance	108,205	50,932	***741*** *Motor Vehicle & Transit Drivers* (32,940)
76 Trades Helpers, Construction Labourers And Related Occupations	15,934	4,370	
82 Skilled Occupations In Primary Industry	39,074	13,362	
84 Intermediate Occupations	17,275	3,144	

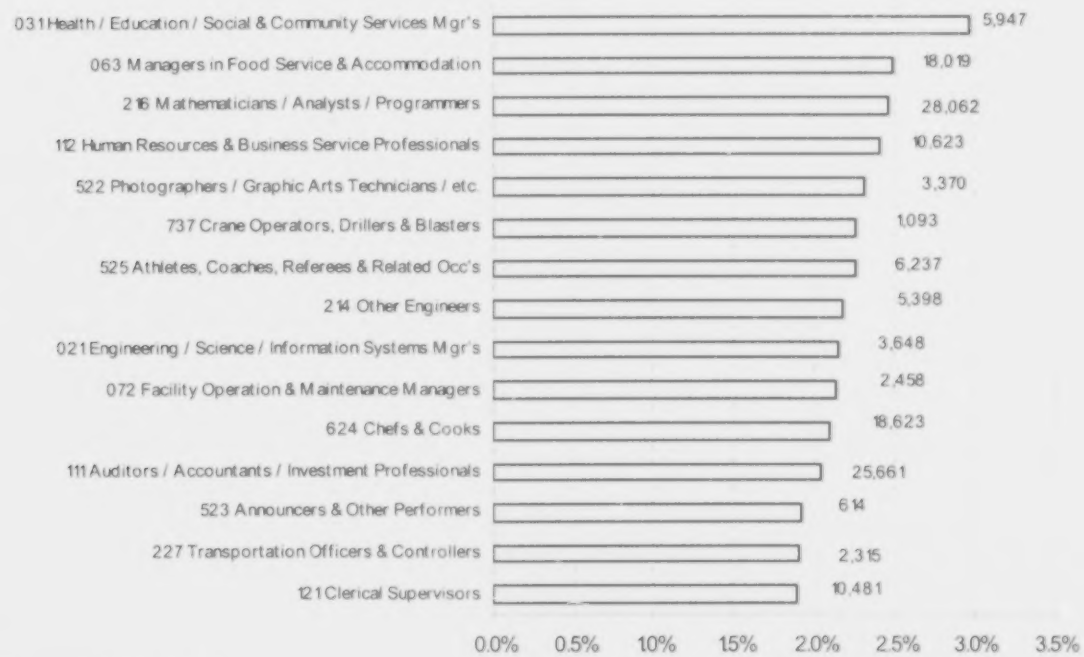
Primary Groups	Estimated Employed in 2003	Open-ings 2003-15	Largest Growth within Primary Group (Selected Occupations)
in Primary Industry			
86 Labourers In Primary Industry	10,485	2,861	
92 Processing, Manufacturing And Utilities Supervisors And Skilled Operators	14,633	6,548	
94-95 Processing And Manufacturing Machine Operators And Assemblers	74,679	27,495	
96 Labourers In Processing, Manufacturing And Utilities	20,322	6,828	
All Occupations	2,001,820	913,285	

Source: COPS and RKA

To summarize, Figure 2 identifies those occupations which are expected to experience the highest growth (as represented by highest average annual growth rates) in the provincial economy between 2003 and 2015. Note that the numbers next to the average annual growth rate for each occupation represent the expected number of total openings for the same period.

Figure 2

Fastest Growing Occupations in Base Model between 2003 and 2015



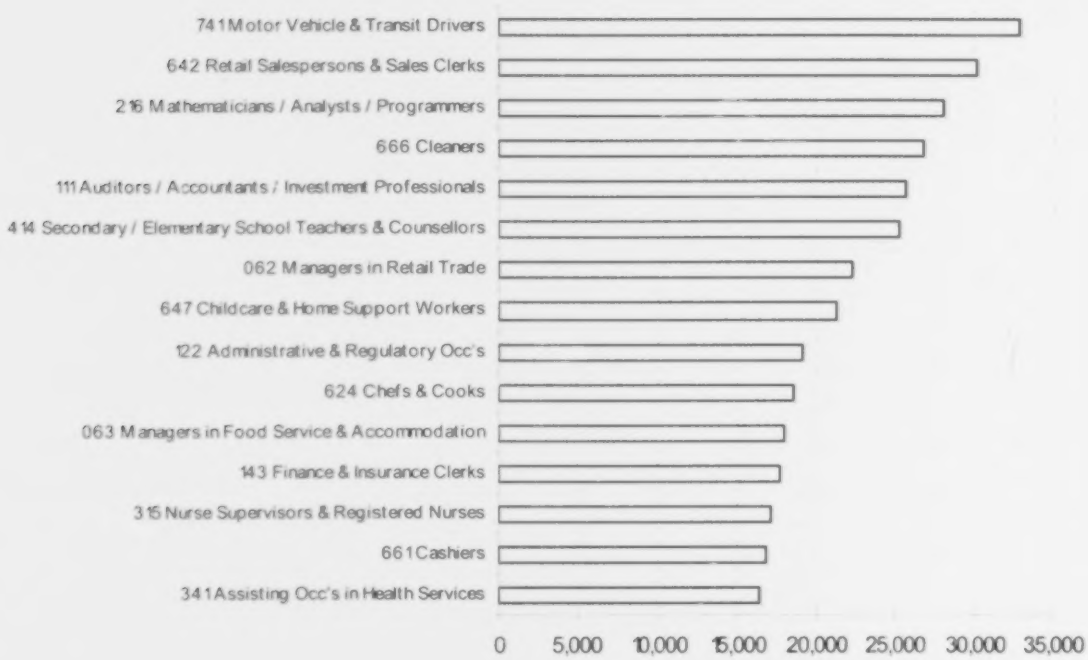
Source: COPS and RKA

Of these occupations that are expected to experience the highest average annual employment growth rates, four are managerial jobs. Other than these managerial jobs, all other occupations have a relatively high skill level and require at least post-secondary education and training.

Figure 3 depicts the occupations which are expected to generate the largest number of total openings for the period 2003 to 2015.

Figure 3

Occupations with Largest Number of Openings in Base Model, 2003-2015



Source: COPS and RKA

Of those occupations that are expected to see the largest number of openings between 2003 and 2015, some require relatively low skill levels. Examples of these are Motor Vehicle and Transit Drivers or Retail Salespersons. However, there are also some occupations that require high skill levels, such as Auditors, Accountants, and Investment Professionals, Secondary and Elementary School Teachers and Counsellors, and Registered Nurses.

3.3 Regional Analysis

Unfortunately, there are no readily available regional employment projections models for the province. The topic is important and further work to develop it in the future is suggested.

In summary, the base model indicates that there will be a total employment demand of approximately 913,000 jobs in BC between 2003 and 2015 without the Games and related projects. Most of them are expected to be in service industries. Also, close to half of all occupations are in skill levels A and B[9], indicating that they require at least some post-secondary education or training.

3.4 Overall Impact of Base Growth

The estimated total employment in BC in 2003 is 2,001,820 or roughly 2 million (COPS estimate – as shown in Table 4). So the 913,000 jobs of base growth represent 45% of all jobs in BC today. It is a very significant change in the labour force during the period of our review.

To put the change in some context, we must consider that the base growth figure of 913,000 jobs contains attrition or replacement jobs as well as net increase in employment. The portion of the base growth that is net increase is 354,990 jobs. To compare this figure with a similar period in the past, we used the Labour Force Survey data for the years between 1990 and 2002, which is also 13 years. The net employment increase total for that period is 464,500 jobs. So the net increase figure for 2003-2015 is not really out of line with what we have experienced before; it is less than for the past 13 years.

However we also must add that the Labour Force Survey data does not provide any estimates of replacement jobs (attrition); and because of demographics we are almost certain that the replacement job numbers in the past have been a lot smaller than they will be in the future.

3.5 Recommendations

3.1 Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply.

We will recommend such work later, in respect of the incremental growth. However, even without the Games and related projects, the growth that we have reviewed in this Chapter is sufficient to merit further work, including supply analysis, both by the Human Resource Planning Committee and by stakeholders in BC's economy.

3.2 Develop regional employment projections models for development regions of BC.

[9] As defined in the National Occupational Classification, skill levels A and B are indicated by "1" (level A) in the second digit of the occupational coding, and "2" or "3" for level B.

Chapter 4 Labour Demand—Incremental Growth

In the previous Chapter we looked at the "base openings" of jobs in BC during the period 2003-2015—openings that are projected to occur in any case, without the 2010 Games and the major projects related to them.

In this Chapter we will examine the "incremental growth", that is the growth that will result from the Games and other major projects. To do this, we will look at each project in turn, and each one of them as having a "stand-alone" impact. We will examine the growth projected to occur because of the 2010 Winter Olympic Games. Then we will look at the growth from the construction and operation activities because of the Vancouver Convention and Exhibition Centre (VCEC) expansion, the Sea-to-Sky Highway Upgrade, and finally the Richmond-Airport-Vancouver Rapid Transit Project (RAV).

For each one, we will consider the growth in a number of ways. We will look at the "direct" impact of the event (the change in labour demand directly produced by it), as well as the indirect impact (the change in labour demand in sectors that supply the project) and the induced impact (the changes in labour demand over the whole economy induced by increased household incomes).

We will view the overall impact from different frames of reference (that is, by industry, by occupation, and year-by-year), always in comparison with the base growth. We will also discuss the aspects of growth (industries or occupations) with the highest impact in numbers of person-years, whether or not those industries or occupations show the highest *percentage* growth. Finally, we will discuss the regions in which the major impact is predicted to occur. However, each of these projections will be for that project alone.

In the final section of this Chapter, we will set forth the total incremental impact by adding the impacts of the various projects: the Games, the VCEC, the Sea-to-Sky Upgrade, and the RAV. We will identify the important common skill sets or clusters that are implicit in the occupational growth we have identified.

For readers familiar with the two previous studies on this topic, *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates* (BCTIO, January 2002) and *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: An Update* (InterVISTAS Consulting Inc., October 2002), "incremental" labour demand is defined slightly differently in our current report. Throughout this study, incrementality refers to any additional employment growth over and above the "baseline" total openings as described in the previous Chapter.

4.1 2010 Vancouver-Whistler Winter Olympic Games

In this section, we will look at the incremental employment growth generated by a successful Bid to host the 2010 Winter Olympic Games (the Games), and make comparisons between such growth and the projected job openings in the province in the absence of the Games.

To start with, we identify the sources of expenditure that will drive this incremental growth. Incremental labour demand due to the Games originates from three major revenue generators:

- Organizing Committee for the Olympic Games (OCOG) costs – direct capital and operating costs related to the Games, e.g. construction of sport venues and athletes' village, security, transportation.
- Non-OCOG costs – capital and operating costs for services and infrastructure to support the Games and spending by broadcasting companies on equipment.
- Visitor and tourist spending – expenditures by spectators to the Games, spending by media, officials, sponsors and athletes at the Games plus other visitors induced before, during and after the Games. These visitors and tourists are attracted to British Columbia because of the publicity from the Games, the Games' aura reflected on the province and the assumed financing and success of a tourism marketing strategy.

The direct source of information that lays the ground for our analysis in this section comes from two previous studies on this topic: *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates* (BC Trade Investment Office in the BC Ministry of Competition, Science and Enterprise, January 2002) and *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: An Update* (InterVISTAS Consulting Inc., October 2002). The Olympic Impact Estimation Model (OIEM) was originally developed by the BC Trade Investment Office (BCTIO) and later modified by InterVISTAS Consulting Inc.

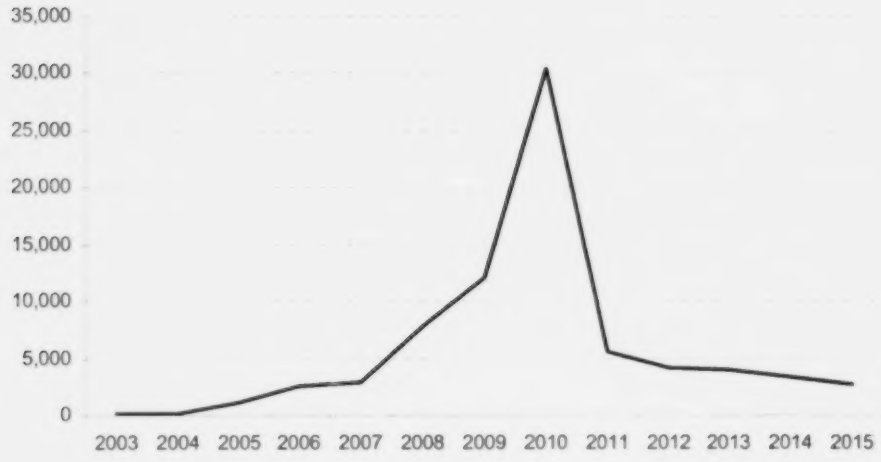
In both studies there were four different tourists/visitors outcome scenarios which were used to estimate four levels of economic impact on the provincial economy from 2003 through to 2020. Each of these scenarios represented a different level of optimism with respect to the success of attracting tourism activities in the province. For the purposes of this report, results derived from the medium-high scenario have been used. This scenario has employment impacts of 55,000 direct person-years and 77,000 total person-years (direct, indirect, and induced), over the period from 2003 to 2015.[10]

Figure 4 provides an overview of the total incremental employment demand (in person years) expected to be generated by the Games. Actual numbers in each of the years between 2003 and 2015 can be found in Table C-1 and Table D-1 in Appendix C and D.

[10] One person-year can be thought of as one Full-Time Equivalent (FTE) person, i.e., one person working full time for a whole year

Figure 4

Incremental Employment Demand due to 2010 Olympic Games, 2003 to 2015 (Person Years)



Source: InterVISTAS

It is not surprising to see in Figure 4 that a large proportion of the incremental demand is expected to concentrate between 2008 and 2011, as the Games itself will be hosted in 2010. All sports venues will be completed and tested in time for the Games, and it is also expected that a large number of visitors/tourists will be drawn to visit the sites the year before the Games (2009) and during the Games (2010).

There are three components to the incremental employment impacts from the Games:

- Direct – which measures the change in employment demand required to satisfy an initial increase of construction and operation spending, and tourist/visitor related spending.
- Indirect – which measures the change in employment demand in sectors that supply goods and services used in the construction of the facilities, operation of the Games, and tourist related spending.
- Induced – which measures the changes in employment demand over all sectors of the economy as a result of an income increase in households impacted both directly and indirectly.

The breakdown of the direct, indirect and induced incremental employment growth due to 2010 Olympic Games is summarized as:

Direct	71 per cent
Indirect and Induced	29 per cent
Total	100 per cent

Source: InterVISTAS and BC Stats

In other words, out of a total of approximately 77,000 person years of incremental growth due to the Games, 55,000 person years are expected to contribute as direct impact.

In the next two sub-sections, we will provide further analysis of the incremental employment impact due to the Games by industry and by occupation.

4.1.1 Incremental Employment Growth by Industry[11]

In this sub-section, we will first show incremental employment growth compared with total job openings in the base model during the period of analysis. Then we will discuss industry impact that is of significance to our study.

In Table 5 we depict incremental employment growth due to the Games, total job openings in the base model, and the percentage increase of incremental over the base for each year during our period of analysis.[12]

It is indicated in Table 5 that, over the period from 2003 to 2015, the total employment impact of 77,000 person years due to the Games itself represents an 8.4 per cent increase over all job openings in the economy generated in the base model.[13] As the incremental growth spreads out over a total of 13 years, it is not so significant in some years. However, incremental growth will represent significant increases over and above employment requirements in the base model from 2008 to 2010. The most significant will be in 2010, when there is expected to be an additional growth of almost 50 per cent in employment.

Table 5 Incremental Employment Growth due to 2010 Olympics Compared with Total Openings in Base Model, 2003 to 2015

Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings

[11] Note that industries presented in this section are those defined by the 1980 Standard Industrial Classification (SIC) and grouped under the Canadian Occupational Projection Systems (COPS). They have been converted from those grouped under the BC Input-Output Model (BCIOM) industries at medium aggregation where direct, indirect, and induced employment impacts have been estimated.

[12] All incremental employment demand by industry through to year 2015 can be found in Table C-1 in Appendix C.

[13] It should be noted that in calculating Incremental Growth as a Percentage of Openings in Base Model, we use employment in person years as the numerator and openings (which include both full-time and part-time, or casual jobs) as the denominator. We recognize such ratios will underestimate the actual percentage growth as one person year can in fact be two half-time jobs.

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	130	70,152	0.2%
2004	200	85,038	0.2%
2005	1,048	82,285	1.3%
2006	2,591	85,211	3.0%
2007	2,801	62,103	4.5%
2008	7,842	61,856	12.7%
2009	12,106	63,533	19.1%
2010	30,382	65,506	46.4%
2011	5,524	66,056	8.4%
2012	4,139	66,775	6.2%
2013	4,021	67,507	6.0%
2014	3,349	68,252	4.9%
2015	2,681	69,011	3.9%
Total	76,813	913,285	8.4%

Source: See Footnote below[14]

The emphasis of analysis in this report is identifying areas where incremental employment demand resulting from the 2010 Games and related projects is expected to pose the biggest challenge to the existing labour force. As such, it is important not only to identify industries where the incremental growth will generate the largest number of openings in the future, but also to identify industries where incremental employment demand represents the highest percentage increase over job openings in the absence of the Games and related projects (i.e., total openings in the base model).

In Table 6 we show incremental employment growth in industries which represent the highest percentage increase over and above openings in base model. Other Manufacturing industries (including such industries as Leather, Textile, Clothing, Furniture and Fixture, and other manufacturing industries) are expected to experience the highest percentage increase (62 per cent) over job openings in the base model. But this is a small industry grouping, and the total incremental employment growth in absolute numbers is about 5,800 person years. The industry that is expected to experience the next highest percentage increase is Accommodation, Food & Recreational Services (32.1 per cent). This growth represents an additional 35,000 person years during the period of analysis.

Table 6 Incremental Employment Demand due to the Games in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015

[14] Original economic impact model developed for the Games by BCTIO and modified by InterVISTAS; direct, indirect and induced employment estimates by industry by BC Stats; base employment by industry from COPS; BC Ministry of Advanced Education and Technology for project specific employment estimate by industry and by occupation.

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Other Manufacturing	5,768	62.0%
Accommodation, Food & Recreational Services	35,389	32.1%
Communication	1,831	17.0%
Printing and Publishing	1,041	13.5%
Advertising	742	13.4%
Professional Business Services	4,452	12.9%
Food Products & Beverages Manufacturing	723	10.7%
Transportation & Storage	4,873	9.1%
Retail Trade	7,394	6.7%
Finance, Insurance, & Real Estate	2,868	5.9%
Construction	2,420	3.9%
Total (incl. other industries)	76,813	8.4%

Source: See Footnote on Page 23

Other industries whose incremental employment growth over openings in the base model is expected to be higher than average and which are expected to generate large numbers of additional person years include Transportation and Storage, and Professional Business Services. Retail and Construction, on the other hand, are also expected to generate significant numbers of additional person years of employment (approximately 7,400 and 2,400 respectively). However, because the size of the total number of openings in the base model is large in each of these industries, such incremental growth represents a relatively moderate impact.

Key informants who were interviewed concerning their expectations of the incremental labour demand gave opinions that agreed with the above projections in terms of Accommodation, Food & Recreational Services and Food Products and Beverages (mainly from the point of view of tourism interviewees). Though Printing and Publishing and Other Manufacturing were not interviewed, other respondents indicated an expectation for considerable impact (with a particular emphasis on the Downtown Eastside). Transportation interviewees likewise confirmed expectations for increased demand. Respondents in the Retail sector acknowledged an impact but were conservative in their expectations. Other respondents, in very general terms, spoke of the impacts on a variety of service industries, which the above table reflects.

4.1.2 Incremental Employment Demand in the Tourism Industry

As pointed out at the beginning of this sub-section, incremental employment growth due to the Games is largely driven by the projected increase in tourist/visitor spending. Here we specifically summarize information pertaining to the tourism industry.

Tourism is not defined as an industry in the Standard Industrial Classification. To estimate GDP or employment generated by the tourism industry, there are various methods.

In the InterVISTAS' report *The Economic Impact of the 2010 Winter Olympic and Paralympic Games: an Update*, there is extensive description of the source of data which was used in estimating the expected visitor/tourist volume and spending patterns. The conclusion regarding the source of information used was that direct impact of the Games on the tourism industry was represented by direct employment in Transport, Retail, Accommodation Services, Food and Beverage Services, and Amusement and Recreation Services. The overall incremental employment impact on tourism (including direct, indirect and induced) was derived using the BC Input-Output Model. This is summarized in Table 7: Note that the incremental employment derived using the BC Input-Output model captures employment in all industries affected by tourism, whether they are usually considered tourist industries or not.

Table 7 Incremental Employment Growth of Games on Tourism in Person Years

	Direct Employment Impact			Indirect Impact	Induced Impact
	Transport	Retail	Accommodation, Food & Recreational Services	All Other Industries	
2007	0	0	1	0	0
2008	260	365	2,501	809	360
2009	364	512	3,502	1,132	504
2010	1,608	2,262	13,701	4,362	1,998
2011	334	470	3,219	1,041	463
2012	250	352	2,411	780	347
2013	243	342	2,343	758	337
2014	203	285	1,952	631	281
2015	162	228	1,562	505	225
Total	3,423	4,818	31,191	10,018	4,514

Source: InterVISTAS

In other words, direct tourism employment impact is estimated at 39,400 person years, and overall incremental growth (including direct, indirect and induced impacts) becomes 54,000 person years during the period from 2007 to 2015.[15]

[15] For comparison purposes, we note that in *The Tourism Sector in British Columbia: Literature Review*,

Normally, Retail employment is not considered tourism related as the majority of the industry's clientele is local residents. However, in the Olympic Impact Estimation Model (OIEM) originally developed by the BC Ministry of Competition, Science and Enterprise and later modified by InterVISTAS, direct employment in Retail was treated as tourism generated because any incremental demand must be Olympics induced largely by tourists visiting BC. The views of key informants we spoke to in the retail sector are not at variance with that model.

4.1.3 Incremental Employment Growth by Occupation

Industry analysis provides an overall picture of where incremental employment demand will likely be over the period reviewed. However, because of the occupational mix within industries, the next step following industry analysis is occupational analysis of the incremental employment growth. In this sub-section, we will provide an insight as to what occupations are likely going to be in highest demand as a result of the 2010 Olympic Games.

Figure 5 below depicts incremental employment demand due to the Games by skill type from 2003 to 2015. Sales and Service Occupations are expected to account for the largest share of incremental employment demand from 2008 onwards. Management jobs are also expected to account for a substantial share of incremental demand during the year of the Games.

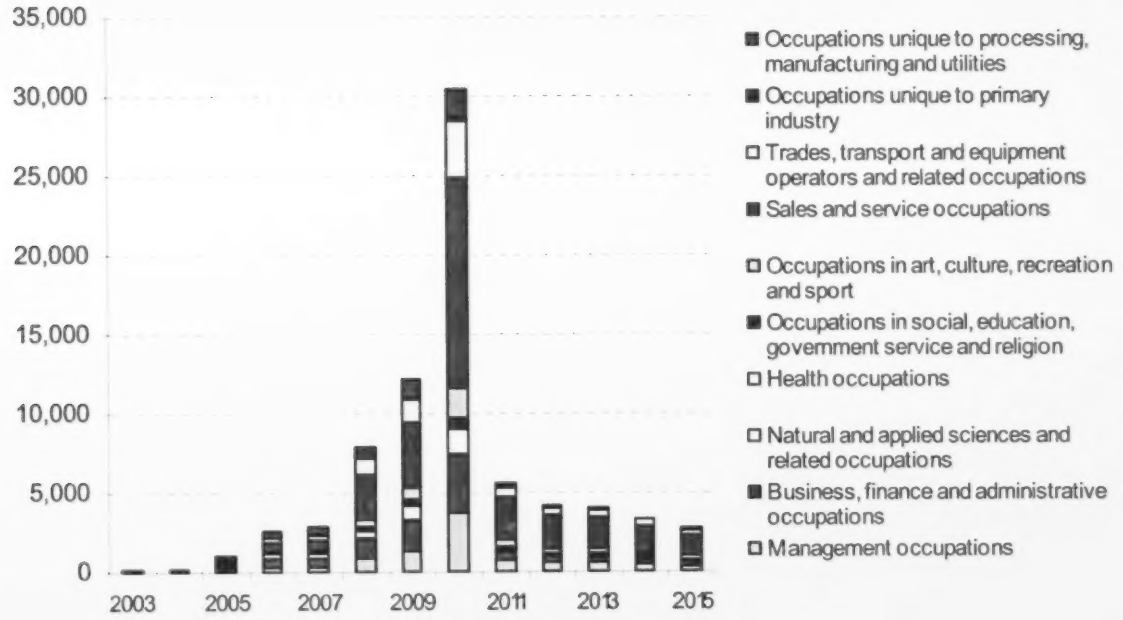
Furthermore, we will identify, in Figure 6 that follows, 15 occupations which are expected to generate the largest amount of incremental employment demand during the period of analysis. These are also occupations that are expected to represent the highest percentage increase over and above total openings in the base model. In the chart itself, the numbers next to each occupation represent the total incremental demand between 2003 and 2015.

It is noted that although construction trades occupations are not shown in Figure 6, because of the relatively small incremental growth, they still will contribute many job openings to the economy. Total incremental growth of construction trades occupations is estimated at approximately 2,400 over the period of analysis.

Labour Market Projections and Training Gap Analysis, by CS Consulting Ltd., Tourism related employment was estimated at 222,500 in year 2001. Overall tourism related employment was projected to be at 273,300 by year 2010 using the COPS base model (i.e., without taking into consideration the 2010 Games), and projected to be at 307,550 using a Tourism BC growth strategy scenario (taking the Games into account). The difference between the latter two, which is attributable to the Games, is 34,250, from 2000 to year 2010. The estimate shown in this Table for incremental employment growth between 2007 and 2010 is 34,240 person years.

Figure 5

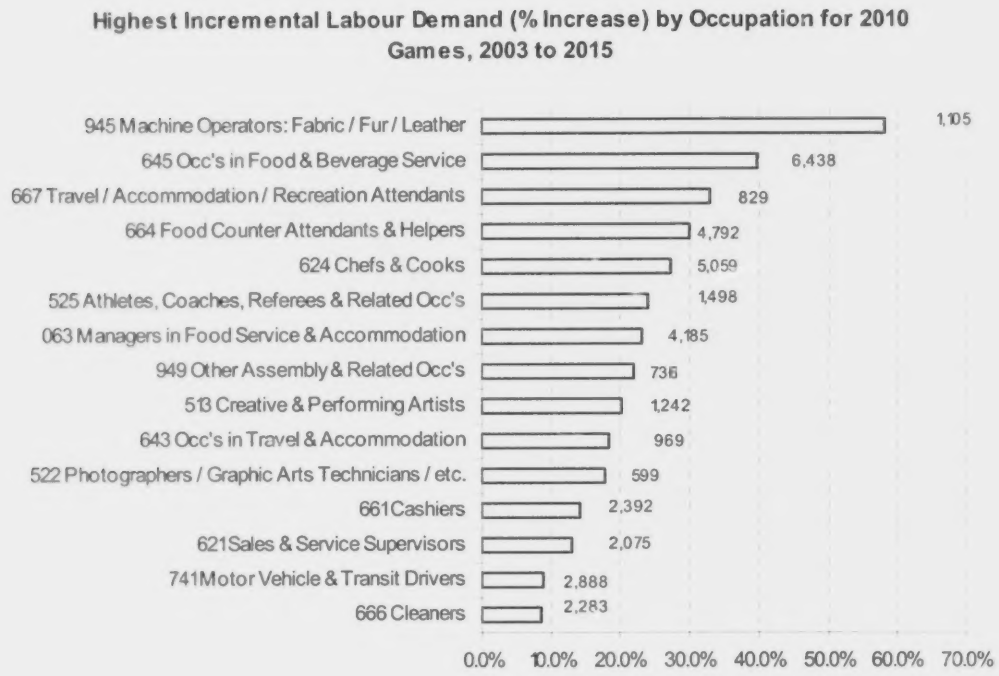
Incremental Employment Demand due to 2010 Games by Skill Type
2003 to 2015



Source: See Footnote on Page 23

Respondents in a variety of capacities were interviewed about their views on occupational demand during the period. They gave a general sense that manufacturing and the garment industry would be busy, although these industries were not approached for interviews. Tourism and travel interviewees concurred with projections for occupational growth as shown above, with an emphasis on management occupations.

Figure 6



Source: See Footnote on Page 23

4.1.4 Incremental Employment Growth by Region

Incremental employment growth from the 2010 Games can be classified in two major categories – that created to meet the needs of organizing and hosting the Games itself, and that created to satisfy tourist/visitor spending. Impact in the first category is most probably limited to the Lower Mainland and the Vancouver/ Whistler/Squamish corridor. However, it is expected that tourism related impact will be felt across the province.

To estimate the incremental employment impact by region in the province, we have relied upon room revenue information that is available from BC Stats.[16] Room revenue is the only statistic that provides detailed geographical breakdown related to the tourism sector on a monthly basis. Using information based on the period from 1995 to 2001, we have derived an approximation (Table 8) of the shares of tourism activity in each Development Region in the province, which was in turn used to allocate incremental employment growth in the tourism sector.

[16] Available from http://www.bcstats.gov.bc.ca/data/bus_stat/tourism/trra2001.csv .

Table 8 Tourism Related Incremental Employment Growth by Development Region

Development Region	Share	Estimated Employment in Person Years (2003-2015)
Vancouver Island/Coast	17.9%	9,674
Mainland/South-west	57.3%	30,943
Thompson/Okan-agan	12.9%	6,966
Kootenay	4.1%	2,217
Cariboo	3.4%	1,846
North Coast	1.5%	802
Nechako	0.7%	383
Northeast	2.1%	1,133
British Columbia		53,964

Source: BC Stats; RKA

4.1.5 Summary

Incremental employment demand total, whether by industry, by occupation or by region, will be 77,000 person years. The Table following summarizes the demand by Pre-, during and Post-Games scenarios.

PRE GAMES EMPLOYMENT DEMAND	DURING GAMES EMPLOYMENT DEMAND	POST GAMES EMPLOYMENT DEMAND
26,717	30,382	19,714

4.2 Vancouver Convention and Exhibition Centre Expansion

In this section, we will look at the incremental employment growth generated as a result of the Vancouver Convention and Exhibition Centre expansion project, and make a comparison between such growth and the projected job openings in the province in the absence of the Games or related projects.

The Vancouver Convention and Exhibition Centre (VCEC) expansion project itself does not depend on the Games, and construction is planned to go ahead from 2003. The construction phase is expected to be completed by 2007. However, once it is in operation from 2008 onwards, it will be in time to play a significant role in the City of Vancouver's hosting of the 2010 Olympic Games. It is in this sense that we consider the two projects related and describe the incremental employment impact to the province.

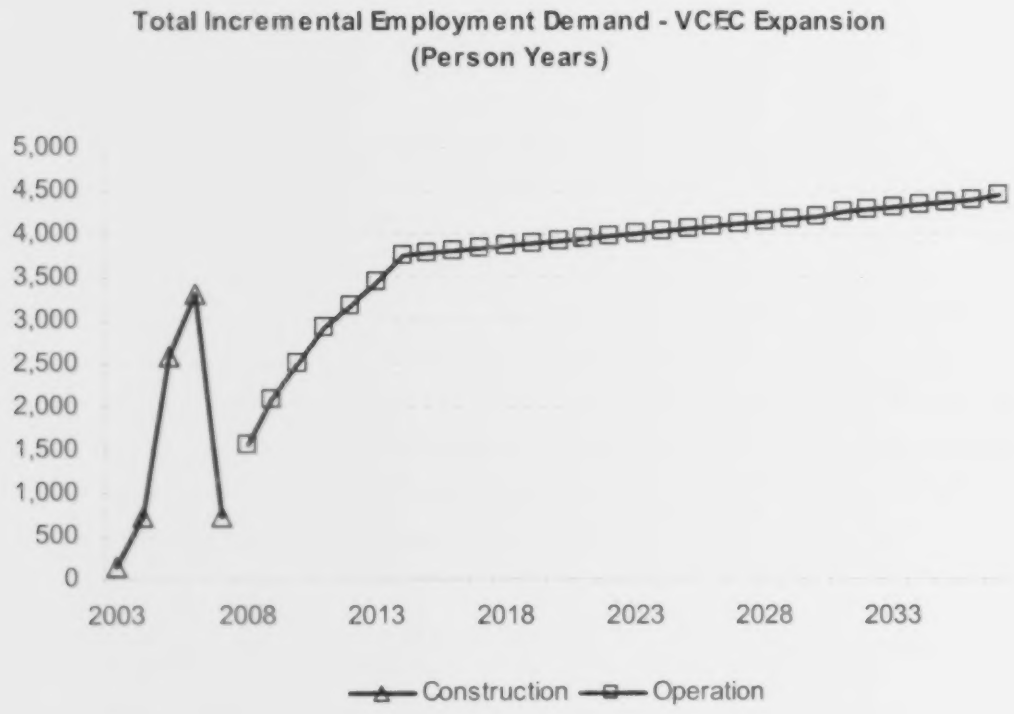
The groundwork and economic model established to estimate the incremental impacts of the project was undertaken by the BC Trade and Investment Office (BCTIO) of the BC Ministry of Competition, Science and Enterprise, and reflected in their study *The Economic Impact of the Winter Olympic and Paralympic Games: Initial Estimates*. In the model, incremental employment demand due to the VCEC expansion originates from the construction phase (between 2003 and 2007) and the ongoing operation to meet the needs of delegates and non-residents. The latter impact is expected to stretch over at least 30 years.

As with the model for estimating economic impacts of the Games, this one is also largely driven by the projected flow of delegates and nor.-residents attending activities showcased at the expanded convention centre. There were three different delegate/non-resident outcome scenarios that were used to estimate three different levels of economic impacts to the provincial economy from 2003 through to 2037. For the purposes of this report, results derived from the moderate scenario have been used. This scenario has employment impacts of 87,700 direct person-years and 121,000 total person-years (direct, indirect, and induced), over the period from 2003 to 2037.

Note that the incremental employment impact here recognizes the additional impact of the Games, which is due to close association between the expansion and the Games. That is, the publicity and general aura of the Games attracts additional conventions and delegates to the VCEC. It does not include the impacts of the Games themselves, nor do the Games' employment impacts include any VCEC impacts.

Figure 7 provides an overview of the total incremental employment demand of the VCEC expansion project. Total incremental labour demand during the construction phase is expected to be 7,500 person years, while total incremental employment demand during the operation phase is expected to be 113,400 person years from 2008 to 2037. To be consistent with the incremental employment impact from the Games, we have only included impact from the VCEC expansion to the year 2015. As such, the total incremental employment impact (direct, indirect and induced) is estimated at 30,660 person years between 2003 and 2015. Actual numbers in each of the years between 2003 and 2015 can be found in Table C-2 and Table D-2 in Appendices C and D.

Figure 7



Source: BCTIO and BC Stats

The model originally developed by BCTIO assumes that annual employment growth from the VCEC expansion between 2009 and 2014 will be strong as a consequence of the Games, but will be much more moderate from 2015 onwards.

As is the case with the impact from the Games, this model recognizes three components of the incremental employment impact:

- Direct – which measures the change in labour demand required to satisfy an initial increase of construction and operational spending.
- Indirect – which measures the change in labour demand in sectors that supply goods and services used in the construction and operation of the facility.
- Induced – which measures the changes in labour demand over all sectors of the economy as a result of an income increase in households impacted both directly and indirectly.

The breakdown of the direct, indirect and induced incremental increase in employment due to the VCEC expansion project can be summarized as:

	Construction Phase	Operation Phase
Direct	58 per cent	73 per cent
Indirect	28 per cent	18 per cent
Induced	14 per cent	9 per cent
Total	100 per cent	100 per cent

Source: BCTIO and BC Stats

That is, out of a total of approximately 30,660 person years of incremental growth due to the VECE expansion, 21,400 person years will contribute as direct impact.

In the next two sub-sections, we will provide further analysis of the incremental employment impact due to the VCEC expansion by industry and by occupation.

4.2.1 Incremental Employment Growth by Industry[17]

In this sub-section, we will first show incremental employment growth compared with total job openings in the base model during the period of analysis. Then we will discuss industry impact that is of significance to our study.

In Table 9 we depict incremental employment growth due to the VCEC expansion project, total job openings in the base model, and the percentage increase of incremental over the base for each year during our period of analysis.[18]

Table 9 Incremental Employment Demand due to VCEC Expansion Project Compared with Total Openings in Base Model, 2003 to 2015

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	147	70,152	0.2%
2004	736	85,038	0.9%
2005	2,575	82,285	3.1%
2006	3,311	85,211	3.9%
2007	736	62,103	1.2%
2008	1,548	61,856	2.5%
2009	2,086	63,533	3.3%
2010	2,500	65,506	3.8%
2011	2,914	66,056	4.4%
2012	3,173	66,775	4.8%
2013	3,431	67,507	5.1%
2014	3,738	68,252	5.5%
2015	3,765	69,011	5.5%
Total	30,660	913,285	3.4%

Source. See Footnote [19]

[17] Note that industries presented in this section are those defined by the 1980 Standard Industrial Classification (SIC) and grouped under the Canadian Occupational Projection Systems (COPS). They have been converted from those grouped under the BC Input-Output Model (BCIOM) industries at medium aggregation where direct, indirect, and induced employment impacts have been estimated.

[18] All incremental employment demand by industry through to year 2015 can be found in Table C-2 in Appendix C.

It is indicated in Table 9 that, over the period from 2003 to 2015, the total employment impact of 30,660 person years due to the VCEC expansion project represents a 3.4 per cent increase over all job openings in the economy generated in the base model.[20] During this period, the incremental increase is expected to be higher than average in year 2006 and from 2010 onwards.

The emphasis of analysis in this report is identifying areas where incremental employment demand resulting from the 2010 Games and related projects is expected to pose the biggest challenge to the existing labour force. As such, it is important not only to identify industries where the incremental growth will generate the largest number of openings in the future, but also to identify industries where incremental growth represents the largest percentage increase over projected openings in the economy in the absence of the Games or related projects.

Table 10 Incremental Employment Demand due to VCEC Expansion in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Other Manufacturing	1,404	15.1%
Accommodation, Food & Recreational Services	11,737	10.6%
Advertising	397	7.2%
Professional Business Services	2,383	6.9%
Construction	4,135	6.7%
Transportation & Storage	2,518	4.7%
Personal & Household Services	954	3.6%
Other Services Industries	847	2.8%
Finance, Insurance, & Real Estate	1,321	2.7%
Retail Trade	1,801	1.6%
Total (incl. other industries)	30,660	3.4%

Source: See Footnote beginning on Page 32

In Table 10 we show incremental employment growth in industries which represent the highest percentage increase over and above openings in the base model. Other Manufacturing industries (including such industries as Leather,

[19] Original economic impact model developed for the VCEC Expansion by BCTIO; direct, indirect and induced employment estimates by industry by BC Stats; base employment by industry from COPS and RKA; BC Ministry of Advanced Education and Technology for project specific employment estimate by industry and by occupation.

[20] It should be noted that in calculating Incremental Growth as a Percentage of Openings in Base Model, we use employment in person years as the numerator and openings (which include both full-time and part-time, or casual jobs) as the denominator. We recognize such ratios will underestimate the actual percentage growth as one person year can in fact be two half-time jobs.

Textile, Clothing, Furniture and Fixtures, and other manufacturing industries) are expected to experience the highest percentage increase (15 per cent) over job openings in the base model. But this is a small industry grouping, and the total incremental employment growth in absolute numbers is about 1,400 person years. The industry that is expected to experience the next highest percentage increase is Accommodation, Food & Recreational Services (10.6 per cent). This growth represents an additional 11,700 person years during the period of analysis.

During the construction phase, incremental employment growth is expected to occur in the Construction and Professional Business Services industries, creating 4,100 and 2,400 person years of employment respectively. The peak of growth is expected to be in 2005 and 2006. During the operational phase the Advertising, Transportation and Storage, and Personal and Household industries are also expected to experience strong incremental employment growth, in addition to Accommodation, Food & Recreational Services.

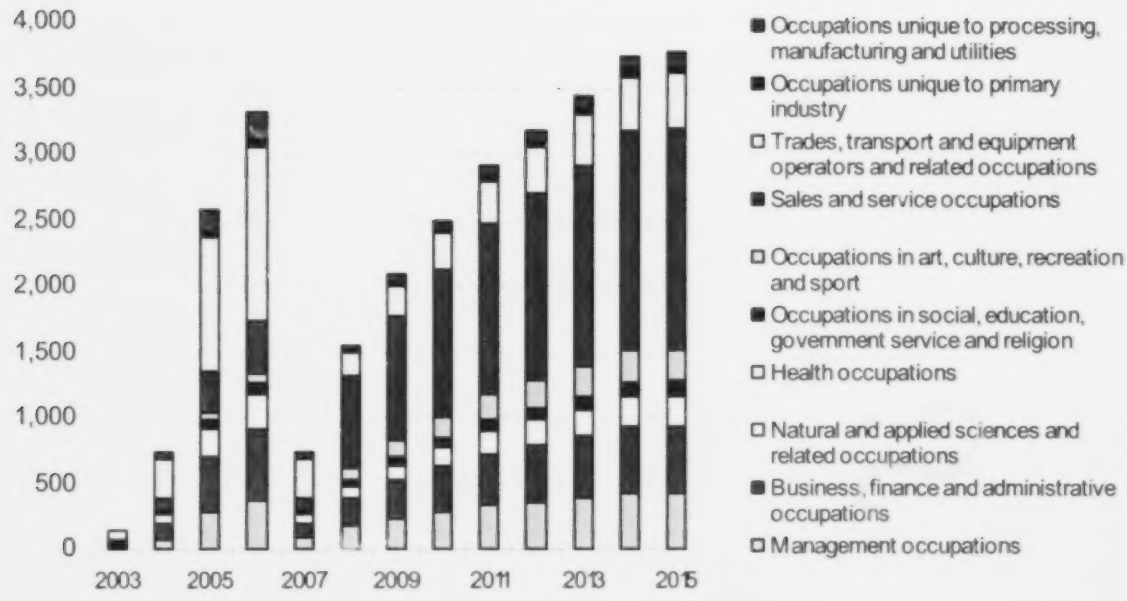
4.2.2 Incremental Demand by Occupation

Industry analysis provides an overall picture of where incremental employment growth will likely be over the next 12 years. However, because of the occupational mix within industries, naturally the next step following industry analysis is occupational analysis of the incremental demand. In this sub-section, we will provide an insight as to what occupations are likely to be in highest demand as a result of the VCEC Expansion project.

Figure 8 depicts incremental employment demand due to the VCEC Expansion project by skill type from 2003 to 2015. Trades, Transport and Equipment Operators are expected to take up the largest share of incremental employment demand in 2005 and 2006, due to the construction of the facility. However, Sales and Service Occupations are expected to account for the largest share of incremental employment demand from 2008 onwards.

Figure 8

Incremental Employment Demand due to VCEC by Skill Type
2003 to 2015

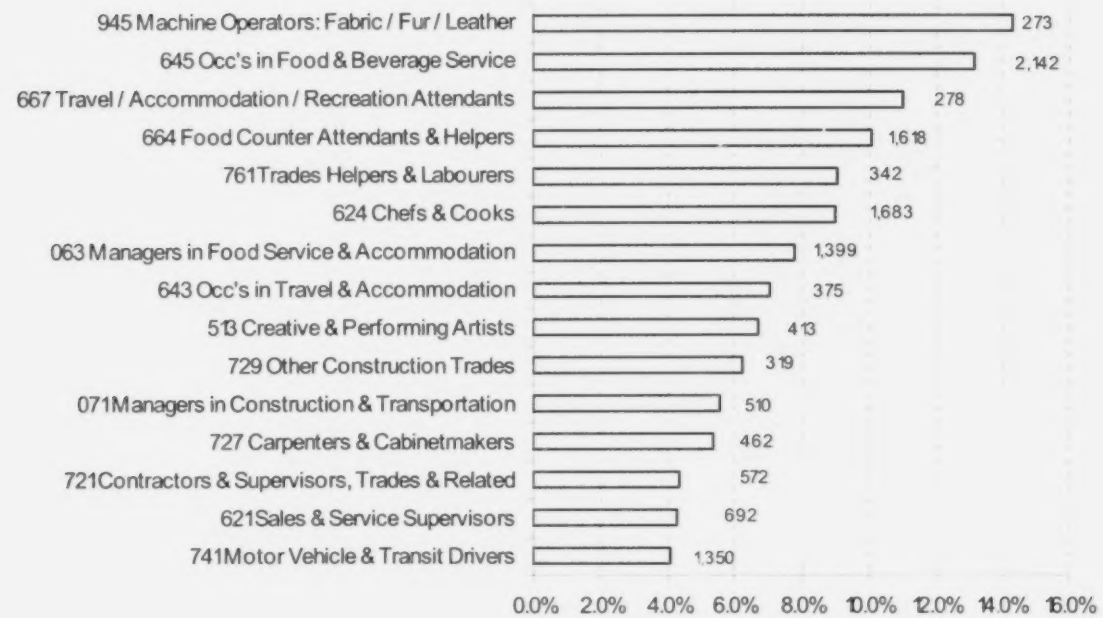


Source: See Footnote beginning on Page 32

Furthermore, we will identify, in Figure 9 that follows, 15 occupations which are expected to generate the largest number of additional jobs (in person years) during the period of analysis. These are also occupations that are expected to represent the highest percentage increase of openings in the base model. In the chart itself, the numbers next to each occupation represent the total incremental demand between 2003 and 2015.

Figure 9

Highest Incremental Labour Demand (% Increase) by Occupation for VCEC Expansion, 2003 to 2015



Source: See Footnote beginning on Page 32

Construction industry key informants identified the Trades, and their helpers and labourers, as in higher demand during the period under discussion. They, as well as community and government representatives, spoke of the opportunity to use the large construction projects to bring more entrants to the aging trades labour force. They also identified an ongoing shortage of managers in the field. Tourism spokespeople concurred with increased demand in the occupations shown in Figure 9.

4.2.3 Incremental Employment Growth by Region

Because of the nature of this project, direct demand will be mainly in the Lower Mainland, but many of the VCEC visitors may stay or return to visit other areas of BC. Though this impact is real, it is hard to measure.

Key informants in various capacities who discussed the construction industry assert that large construction projects draw skilled tradespeople from across the country, and in particular British Columbians who may have left to pursue work in

other large projects. Similar observations were made about labour in Tourism and Retail, with increased demand in their sectors.

An aspect of this attraction of workers into the region known to have large projects underway, is that other regions of the province may experience reduced labour supply as a result.

Informants in the Technology sector particularly emphasized the impact of visits and of the desirability of showcasing of the city/province, to both high-tech workers and investors. These comments highlight the importance (well understood by that sector) of adequate supplies of human resources in a local area. It is important to consider possible effects of the major projects on areas outside of the Lower Mainland.

4.2.4 Summary

Total incremental employment demand due to the VCEC Expansion project will be 30,660 person years over the period from 2003 to 2015. We further summarize here the incremental growth in Pre-, during and Post-Games periods.

Pre-Games 2003-2009	Games Year 2010	Post-Games 2011-2015
11,139	2,500	17,021

4.3 Sea-to-Sky Highway Upgrade

In this section, we will look at the incremental employment growth generated as a result of the Sea-to-Sky Highway upgrade project, and make comparison between such growth and the projected job openings in the province in the absence of the Games or related projects.

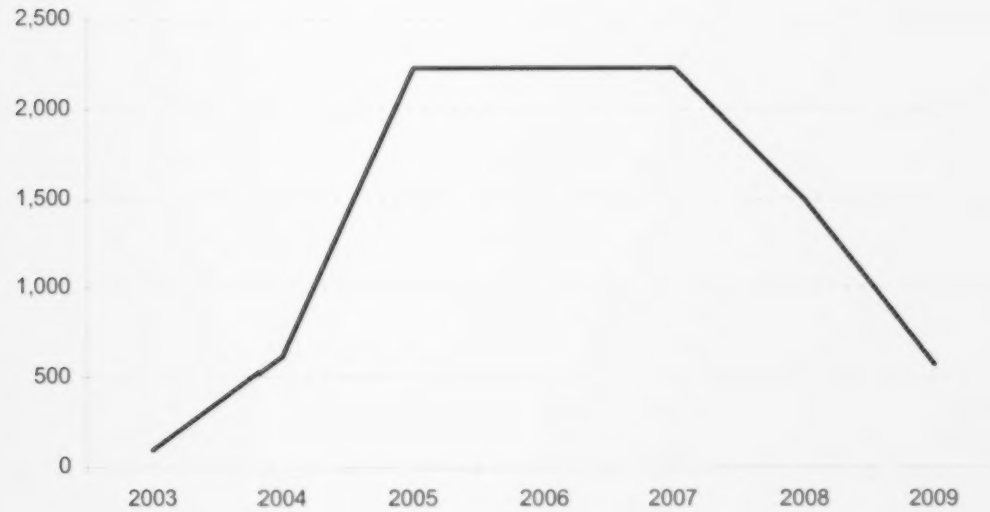
Incremental employment demand due to the Sea-to-Sky Highway upgrade project originates from the proposed provincial and federal governments' funding to improve the safety of the highway. The upgrade itself does not depend upon the occurrence of the Games. However, if Vancouver is successful in hosting the 2010 Olympic Games, governments will expedite the completion of the upgrade in time for the Games.

The basis of analysis in this section is the number of direct person years required between 2003 and 2009, provided by the BC Ministry of Transportation and Highways. Total direct employment demand is estimated at 5,930 person years. BC Stats derived the total incremental employment demand (including direct, indirect and induced) using the BC Input-Output Model. Total direct, indirect and induced employment demand is estimated at 9,500 person years.

Figure 10 provides an overview of the total incremental employment demand of the Sea-to-Sky Highway upgrade project. The highest incremental employment demand is expected to fall in the years 2005 to 2007.

Figure 10

Incremental Employment Demand due to Sea-to-Sky HW Upgrade, 2003 to 2009 (Person Years)



Source: See Footnote (below)[21]

This graph emphasizes what many of the key informants stated during interviews – the importance of peak activity times during the years when the different projects take place. It means that planning for each of the projects will need to take into account as much as possible the activities going on in other projects. The effect of similar activities peaking at the same time in more than one project will exacerbate any shortages that may be brought about by incremental demand. This planning, and the avoidance of overlap, will be made easier by the fact that construction work is not generic; residential construction does not draw on the same trades as commercial, and highway construction is again different. But planning will be needed to consider the draws upon the same labour pools that do occur.

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[21] Original direct employment estimates by BC Ministry of Transportation and Highways; direct, indirect and induced employment estimates by industry by BC Stats; base employment by industry from COPS and RKA; BC Ministry of Advanced Education and Technology for project specific employment estimate by industry and by occupation

As described earlier, the incremental employment impact we discuss in this section consists of three components:

- Direct – which measures the change in labour demand required to satisfy an initial increase of construction spending.
- Indirect – which measures the change in labour demand in industries that supply goods and services used in the construction of the highway.
- Induced – which measures the changes in labour demand over all sectors of the economy as a result of an income increase in households impacted both directly and indirectly.

The breakdown of the direct, indirect and induced incremental increase in employment due to the Sea-to-Sky Highway upgrade project is

Direct	63 per cent
Indirect and Induced	37 per cent
Total	100 per cent

Source: BC Ministry of Transportation and Highways and BC Stats

In the next two sub-sections, we will provide further analysis of the incremental employment impact due to the Sea-to-Sky Highway upgrade by industry and by occupation.

4.3.1 Incremental Employment Growth by Industry[22]

In this sub-section, we will first show incremental employment growth compared with total job openings in the base model during the period of analysis. Then we will discuss industry impact that is of significance to our study.

In Table 11 we depict incremental employment growth due to the Sea-to-Sky Highway upgrade project, total job openings in the base model, and the percentage increase of incremental over the base for each year during our period of analysis.[23]

Table 11 Incremental Employment Growth due to Sea-to-Sky Highway Upgrade Compared with Total Openings in Base Model, 2003 to 2015

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	96	70,152	0.1%
2004	613	85,038	0.7%
2005	2,231	82,285	2.7%
2006	2,231	85,211	2.6%

[22] Note that industries presented in this section are those defined by the 1980 Standard Industrial Classification (SIC) and grouped under the Canadian Occupational Projection Systems (COPS). They have been converted from those grouped under the BC Input-Output Model (BCIOM) industries at medium aggregation where direct, indirect, and induced employment impacts have been estimated.

[23] All incremental employment demand by industry through to year 2009 can be found in Table C-3 in Appendix C.

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2007	2,231	62,103	3.6%
2008	1,482	61,856	2.4%
2009	566	63,533	0.9%
2010	0	65,506	0.0%
2011	0	66,056	0.0%
2012	0	66,775	0.0%
2013	0	67,507	0.0%
2014	0	68,252	0.0%
2015	0	69,011	0.0%
Total	9,449	913,285	1.0%

Source: See Footnote on Page 38

It is shown in Table 11 that, over the period from 2003 to 2015, the total employment impact of 9,500 person years due to the Sea-to-Sky Highway upgrade project represents only a 1.0 per cent increase over all job openings in the economy generated in the base model.[24] This moderate percentage increase is due to the fact that the actual construction activities are limited to the years between 2003 and 2009.

The emphasis of analysis in this report is identifying areas where incremental labour demand resulting from the 2010 Games and related projects is expected to pose the biggest challenge to the existing labour force. As such, it is important to not only identify industries where the incremental employment growth will generate the largest number of openings in the future, but also to identify industries where incremental employment demand represents the highest percentage increase over existing openings in the absence of the Games and related projects.

Table 12 Incremental Employment Demand due to Sea-to-Sky Highway Upgrade in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Construction	6,028	9.7%
Mining, Quarries & Sand Pits	188	7.6%
Manufactured Mineral Products	266	4.8%
Metal Fabrication & Machinery, except electrical	116	1.9%

[24] It should be noted that in calculating Incremental Growth as a Percentage of Openings in the Base Model, we use employment in person years as the numerator and openings (which include both full-time and part-time, or casual jobs) as the denominator. We recognize such ratios will underestimate the actual percentage growth as one person year can in fact be two half-time jobs.

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Advertising	80	1.5%
Professional Business Services	482	1.4%
Other Services Industries	208	0.7%
Finance, Insurance, & Real Estate	324	0.7%
Wholesale Trade	297	0.6%
Retail Trade	399	0.4%
Total (incl. other industries)	9,449	1.0%

Source: See Footnote on Page 38

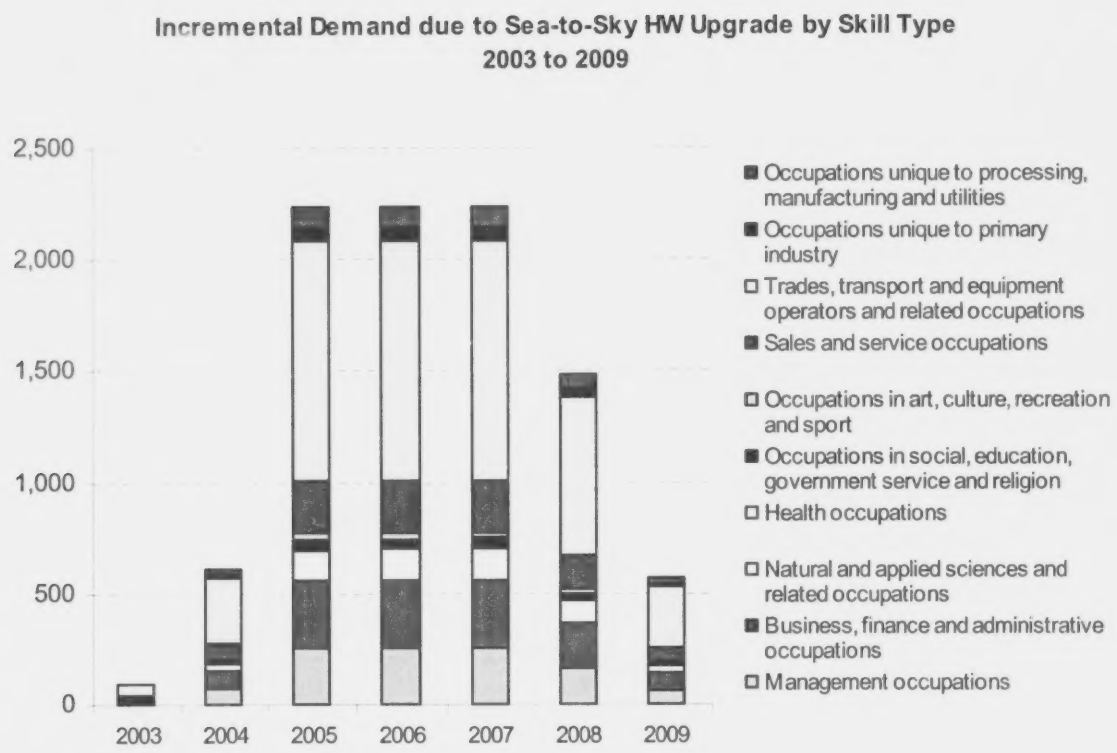
In Table 12 we show incremental employment growth in industries which represent the highest percentage increase over and above openings in the base model. It is not surprising to see that the Construction industry is expected to experience the highest percentage increase (9.7 per cent) over job openings in the base model, contributing about 6,000 additional person years of employment. Industries that supply raw and manufactured materials to road construction are also expected to experience higher than average percentage increases over employment in the base model. But these are small industry groupings, and the total incremental employment growth in absolute numbers is about 600 person years. Professional services industries such as Advertising and Professional and Business Services will also benefit, creating an additional 600 person years of employment during the period of analysis.

4.3.2 Incremental Employment Growth by Occupation

Industry analysis provides an overall picture of where incremental employment growth will likely be over the period of analysis. However, because of the different occupational mix within industries, the next step following industry analysis is occupational analysis of the incremental demand. In this sub-section, we provide an insight as to what occupations are likely going to be in highest demand as a result of the Sea-to-Sky Highway Upgrade project.

Figure 11 depicts incremental labour demand due to the Sea-to-Sky Highway Upgrade project by skill type from 2003 to 2009. Trades, Transport and Equipment Operators are expected to take up the largest share of incremental employment demand from 2004 to 2009. Natural and Applied Sciences and Related Occupations are expected to account for a large share of incremental employment demand during the same period. Examples of occupations within the latter occupational grouping are Civil/Mechanical/Electrical/Chemical Engineers, and Civil/Mechanical/Electrical/Chemical Technicians.

Figure 11



Source: See Footnote on Page 38

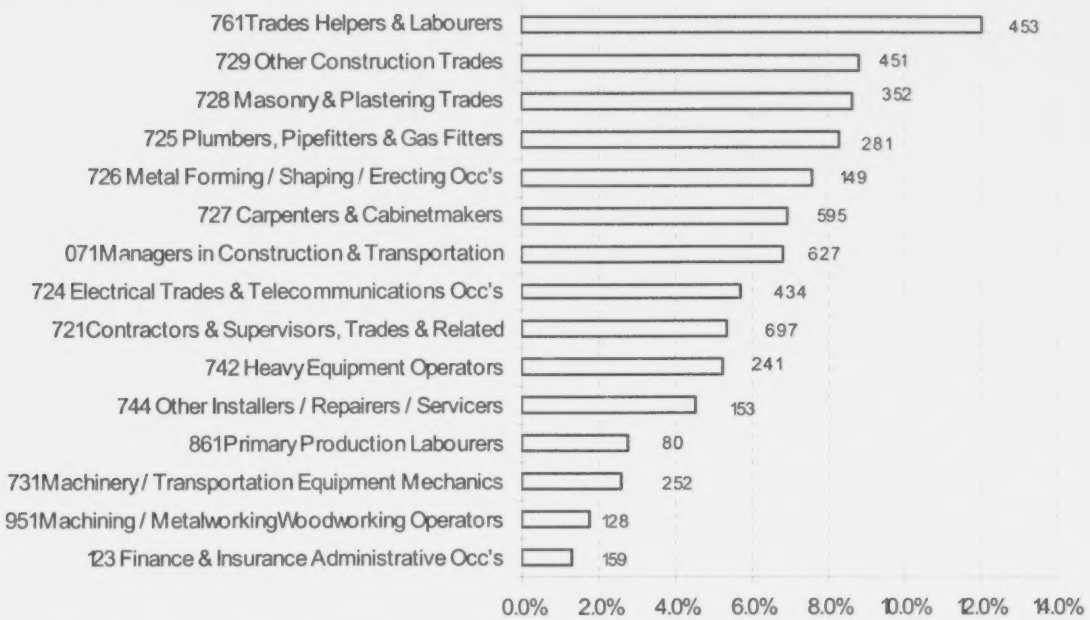
Key informants acknowledged heavy demand in construction trades during the lead-up to the Olympics and related projects. They also told us that the industry in BC is large enough to accommodate the incremental change, as it will be spread out over years. Numerous key informants predict, too, that labour will migrate to BC, much of it labour returning to BC, which it has left in pursuit of large projects elsewhere, notably in Alberta.

In general, key informants did not mention occupations such as business, finance and administrative occupations in relation to this project, nor sales and service.

In Figure 12 that follows, we will identify 15 occupations which are expected to generate the largest amount of incremental employment growth during the period of analysis. These are also occupations that are expected to represent the highest percentage increase of base employment growth. In the chart itself, the numbers next to each occupation represent the total incremental demand between 2003 and 2009.

Figure 12

Highest Incremental Labour Demand (% Increase) by Occupation for Sea-to-Sky Project, 2003 to 2009



Source: See Footnote on Page 38

Corresponding to our industry analysis in the previous sub-section, those occupations that are expected to experience the highest percentage increase over and above openings in the base model are construction related trades.

Key informants are well aware of the strains that large projects such as this one put on the pool of construction managers and supervisors. They were generally aware of the variety of other trades highlighted above, and emphasized that demand of this kind will be an opportunity to bring new entrants into the trades, whose numbers are threatened by the demographics of an aging workforce. However, respondents did not mention any Finance and Insurance occupations.

4.3.3 Incremental Employment Growth by Region

Because of the nature of road construction, direct employment impact is likely to be in the Lower Mainland, with the majority being at the Whistler/Squamish Corridor. The area and the infrastructure will have some impact on the rest of the

province by attracting visitors who may stay or return to visit other areas of BC. Though this impact is real, it is hard to measure.

Key informants in various capacities who discussed the construction sector indicated that it is reasonable to expect a large project of this kind to draw skilled (and unskilled) labour to BC – in particular returning British Columbians who have left to pursue work in other areas, such as Alberta. It should also be emphasized that it is worth considering the possible reduced labour supplies in areas of BC outside the Lower Mainland when major projects draw workers away from them.

4.3.4 Summary

Total incremental employment demand from the Sea-to-Sky Highway upgrade is estimated at 9,449 over the period from 2003 to 2009. Over our period of analysis for all Games and related projects, which is from 2003 to 2015, this represents a 1.0 per cent increase over the base openings for the economy. All construction is expected to complete prior to the 2010 Games.

4.4 Richmond-Airport-Vancouver Rapid Transit Project

In this section, we will look at the incremental employment growth generated as a result of the Richmond-Airport-Vancouver Rapid Transit project, and make comparison between such growth and the projected job openings in the province in the absence of the Games or related projects.

Incremental employment demand due to the Richmond-Airport-Vancouver project originates from the proposed provincial and municipal governments' and other funding to build a new branch of Greater Vancouver's SkyTrain system. The project itself does not depend upon the occurrence of the Games. However, if Vancouver is successful in its bid to host the 2010 Olympic Games, it will expedite the completion of the project in time for the Games. In this sense, the project becomes one related to the Games.

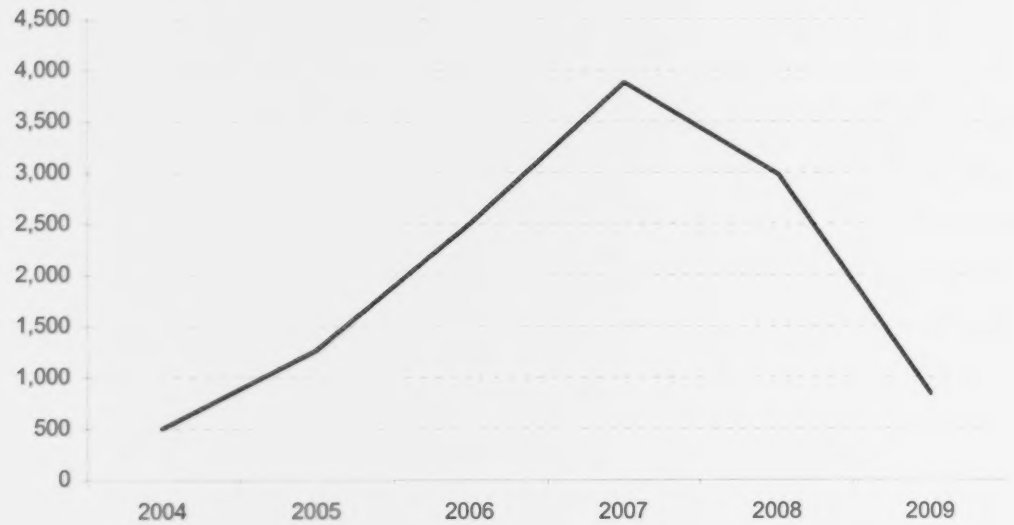
The basis of analysis in this section is the number of direct person years required for the project between 2004 and 2009, provided by Richmond-Airport-Vancouver Rapid Transit Project (part of Translink). We have been provided with a Resource Summary Statement and a Cash Flow Statement for the purpose of this report. The Resource Summary Statement provides total costs over the entire construction period, broken down into categories like Labour, Materials, Equipment, etc. Estimates of the manpower required (in person-years) and the local content of materials and equipment were also provided. There was also a category of Contingency Cost of Labour, Materials and Equipment. As it was unclear whether such costs would be incurred, a decision was made to have two scenarios for the purposes of our analysis. The Low Estimates refer to the Without Contingency Cost scenario and the High Estimates refer to the With Contingency Cost scenario.

Total direct employment demand is estimated between at 5,200 to 6,200 person years. BC Stats derived the total incremental employment demand (including direct, indirect and induced) using the BC Input-Output Model. Such indirect and induced employment demand is estimated to be between 6,700 and 8,700 person years.

Figure 13 and Figure 14 provide low and high overviews of the total incremental employment growth due to the Richmond-Airport-Vancouver Rapid Transit Project.

Figure 13

Total Incremental Employment Demand, Richmond-Airport-Vancouver Rapid Transit Project - Low Estimate (Person Years)

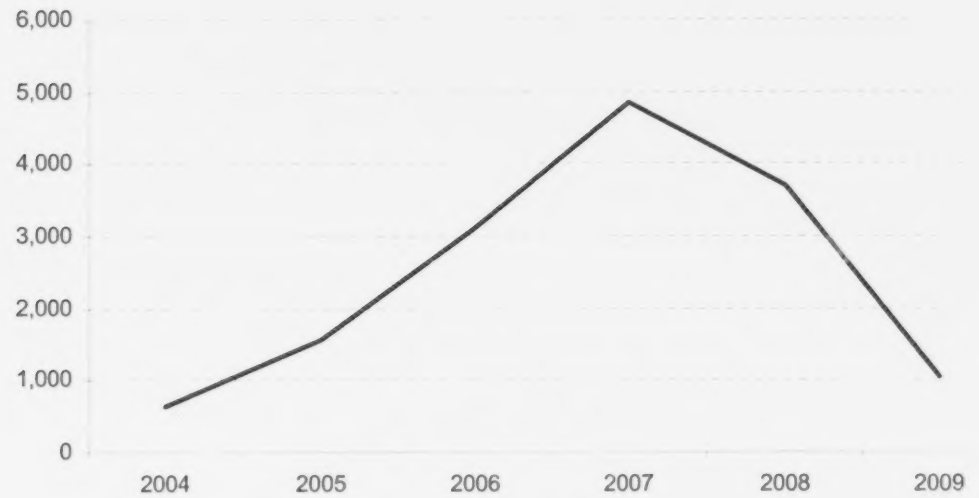


Source: See Footnote[25]

[25] Original direct employment estimates from a Resource Summary Statement by Richmond-Airport-Vancouver Rapid Transit Project; aggregate direct, indirect and induced employment estimates produced by industry by BC Stats and allocated in the assumed project years by RKA from a Cash Flow Statement also provided by Richmond-Airport-Vancouver Rapid Transit Project; base employment by industry from COPS and RKA; BC Ministry of Advanced Education and Technology for project specific employment estimate by industry and by occupation.

Figure 14

Total Incremental Employment Demand, Richmond-Airport-Vancouver Rapid Transit Project - High Estimate (Person Years)



Source: See Footnote beginning on Page 45

From these two charts, it is indicated that the peak of incremental employment growth is expected to be in 2007.

Total incremental employment growth discussed throughout this section consists of three components:

- Direct – which measures the change in labour demand required to satisfy an initial increase of construction spending.
- Indirect – which measures the change in labour demand in industries that supply goods and services used in the construction of the highway.
- Induced – which measures the changes in labour demand over all sectors of the economy as a result of income increase in households impacted both directly and indirectly.

The breakdown of direct, indirect and induced incremental increase in labour demand due to the Richmond-Airport-Vancouver Rapid Transit Project is summarized as:

Direct	43 per cent
Indirect	34 per cent
Induced	23 per cent
Total	100 per cent

Source: Richmond-Airport-Vancouver Rapid Transit Project and BC Stats

In the next two sub-sections, we will provide further analysis of the incremental employment impact due to the Richmond-Airport-Vancouver Rapid Transit Project by industry and by occupation.

4.4.1 Incremental Employment Growth by Industry[26]

In this sub-section, we will first show incremental employment growth compared with total job openings in the base model during the period of analysis. Then we will discuss industry impact that is of significance to our study.

In Table 13 we depict incremental employment growth due to the Richmond-Airport-Vancouver Rapid Transit Project, total job openings in the base model, and the percentage increase of incremental over the base for each year during our period of analysis.[27]

Table 13 Incremental Employment Growth due to Richmond-Airport-Vancouver Rapid Transit Project Compared with Total Openings in Base Model, 2003 to 2015 (Low Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	0	70,152	0.0%
2004	498	85,038	0.6%
2005	1,256	82,285	1.5%
2006	2,502	85,211	2.9%
2007	3,888	62,103	6.3%
2008	2,972	61,856	4.8%
2009	840	63,533	1.3%
2010	0	65,506	0.0%
2011	0	66,056	0.0%
2012	0	66,775	0.0%
2013	0	67,507	0.0%
2014	0	68,252	0.0%
2015	0	69,011	0.0%
Total	11,957	913,285	1.3%

Source: See Footnote on Page 45

[26] Note that industries presented in this section are those defined by the 1980 Standard Industrial Classification (SIC) and grouped under the Canadian Occupational Projection Systems (COPS). They have been converted from those grouped under the BC Input-Output Model (BCIOM) industries at medium aggregation where direct, indirect, and induced employment impacts have been estimated.

[27] All incremental employment demand by industry through to year 2009 can be found in Table C-4A and Table C-4B in Appendix C.

Table 14 Incremental Employment Growth due to Richmond-Airport-Vancouver Rapid Transit Project Compared with Total Openings in Base Model, 2003 to 2015 (High Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	0	70,152	0.0%
2004	620	85,038	0.7%
2005	1,563	82,285	1.9%
2006	3,114	85,211	3.7%
2007	4,837	62,103	7.8%
2008	3,698	61,856	6.0%
2009	1,046	63,533	1.6%
2010	0	65,506	0.0%
2011	0	66,056	0.0%
2012	0	66,775	0.0%
2013	0	67,507	0.0%
2014	0	68,252	0.0%
2015	0	69,011	0.0%
Total	14,877	913,285	1.6%

Source: See Footnote on Page 45

From Table 13 and Table 14, we see that, over the period from 2003 to 2015, the total employment impact of between 12,000 and 14,900 person years due to the Richmond-Airport-Vancouver Rapid Transit Project represents an approximately 1.5 per cent increase over all job openings in the economy generated in the base model.[28] During this period, such incremental increase is expected to be concentrated between 2006 and 2008.

The emphasis of analysis in this report is identifying areas where incremental employment growth resulting from the 2010 Games and related projects is expected to pose the biggest challenge to the existing labour force. As such, it is important not only to identify industries where the incremental growth will generate the largest number of openings in the future, but also to identify industries where incremental employment demand represents the highest percentage increase over base openings in the absence of the Games or related projects.

[28] It should be noted that in calculating Incremental Growth as a Percentage of Openings in Base Model, we use employment in person years as the numerator and openings (which include both full-time and part-time, or casual jobs) as the denominator. We recognize such ratios will underestimate the actual percentage growth as one person year can in fact be two half-time jobs.

Table 15 Incremental Employment Growth due to Richmond-Airport-Vancouver Rapid Transit Project in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015 (Low Estimate)

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Construction	5,318	8.6%
Metal Fabrication & Machinery, except electrical	389	6.4%
Electrical & Electronic Products	213	5.7%
Advertising	145	2.6%
Professional Business Services	873	2.5%
Wholesale Trade	942	1.8%
Finance, Insurance, & Real Estate	562	1.2%
Retail Trade	853	0.8%
Total (incl. other industries)	11,957	1.3%

Source: See Footnote on Page 45

Table 16 Incremental Employment Growth due to Richmond-Airport-Vancouver Rapid Transit Project in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015 (High Estimate)

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Construction	6,311	10.2%
Metal Fabrication & Machinery, except electrical	612	10.1%
Electrical & Electronic Products	377	10.1%
Wholesale Trade	1,484	2.9%
Advertising	155	2.8%
Professional Business Services	928	2.7%
Finance, Insurance, & Real Estate	666	1.4%
Retail Trade	1,041	0.9%
Total (incl. other industries)	14,887	1.6%

Source: See Footnote on Page 45

In Table 15 and Table 16 we show incremental employment growth in industries which represent the highest percentage increase over and above openings in the base model. It is not surprising to see that the Construction industry is expected to experience the highest percentage increase (8.6 to 10.2 per cent) over and above job openings in the base model, contributing between 5,300 and 6,300

additional person years of employment. Industries that supply manufactured materials to construction, such as Metal Fabrication and Electrical and Electronic Manufacturing industries are also expected to experience higher than average percentage increases of employment in the base model. But these are small industry groupings, and the total incremental employment growth in absolute numbers is about 600 to 1,000 person years. Business services industries such as Advertising and Professional and Business Services will also benefit, creating an additional 1,000 to 1,100 person years of employment during the period of analysis.

4.4.2 Incremental Employment Growth by Occupation

Industry analysis provides an overall picture of where incremental employment demand will likely be over the next 12 years. However, because of the different occupational mix within industries, the next step following industry analysis is occupational analysis of such demand. In this section, we provide an insight as to what occupations are likely going to be in highest demand as a result of the Richmond-Airport-Vancouver Rapid Transit Project.

Figure 15 and Figure 16 depict incremental employment growth due to the Richmond-Airport-Vancouver Rapid Transit Project by skill type from 2004 to 2009.

In these two charts, Trades, Transport and Equipment Operators are expected to take up the largest share of incremental employment demand from 2004 to 2009. Natural and Applied Sciences and Related Occupations are also expected to account for significant shares of incremental employment demand during the same period. (Examples of occupations within this group are Civil /Mechanical /Electrical /Chemical Engineers, and Civil /Mechanical /Electrical /Chemical Technicians.)

Figure 15

Incremental Employment Demand due to RAV by Skill Type, 2004 to 2009
(Low Estimate)

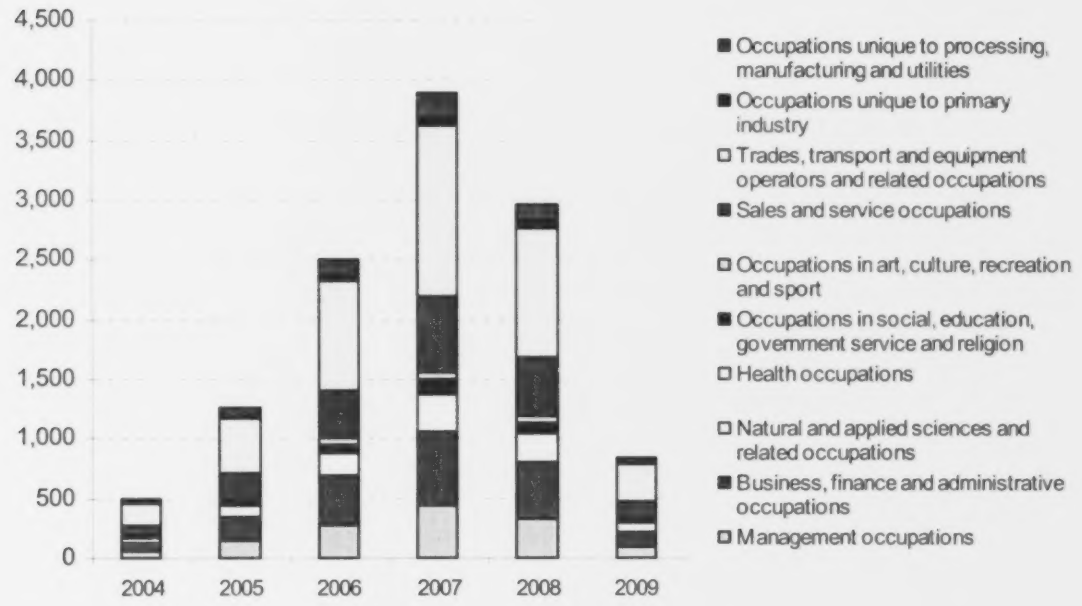
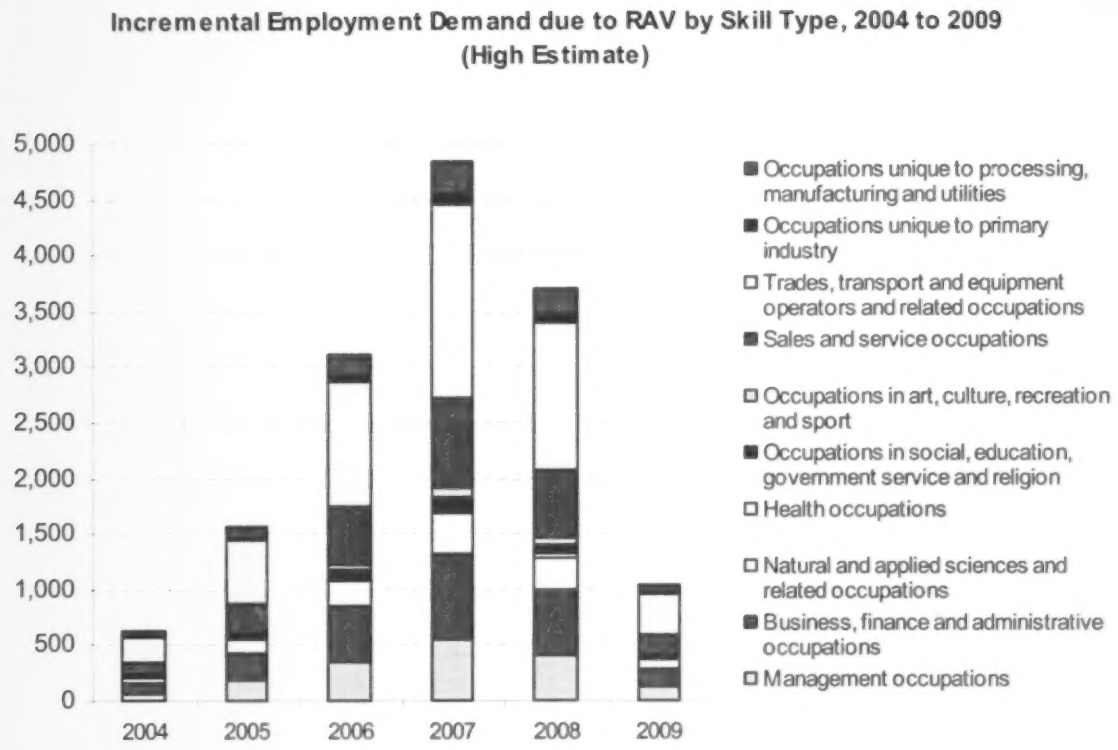


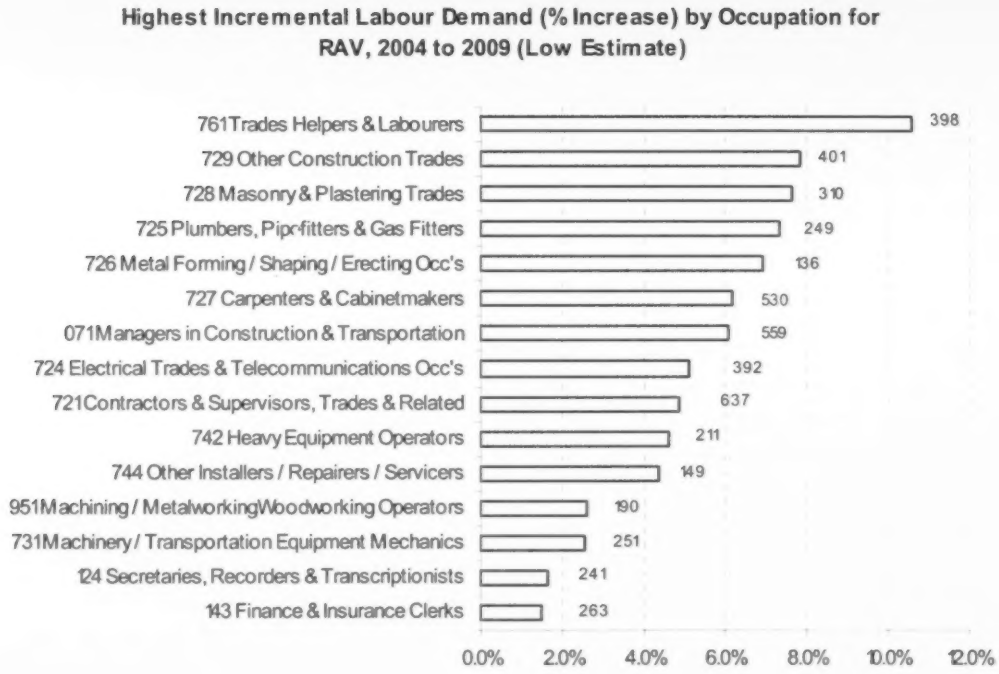
Figure 16



Source for both Figures15 and 16: See Footnote on Page 45

Furthermore, we will identify in Figure 17 and Figure 18 that follow, 15 occupations which are expected to generate the largest incremental demand during the period of analysis.

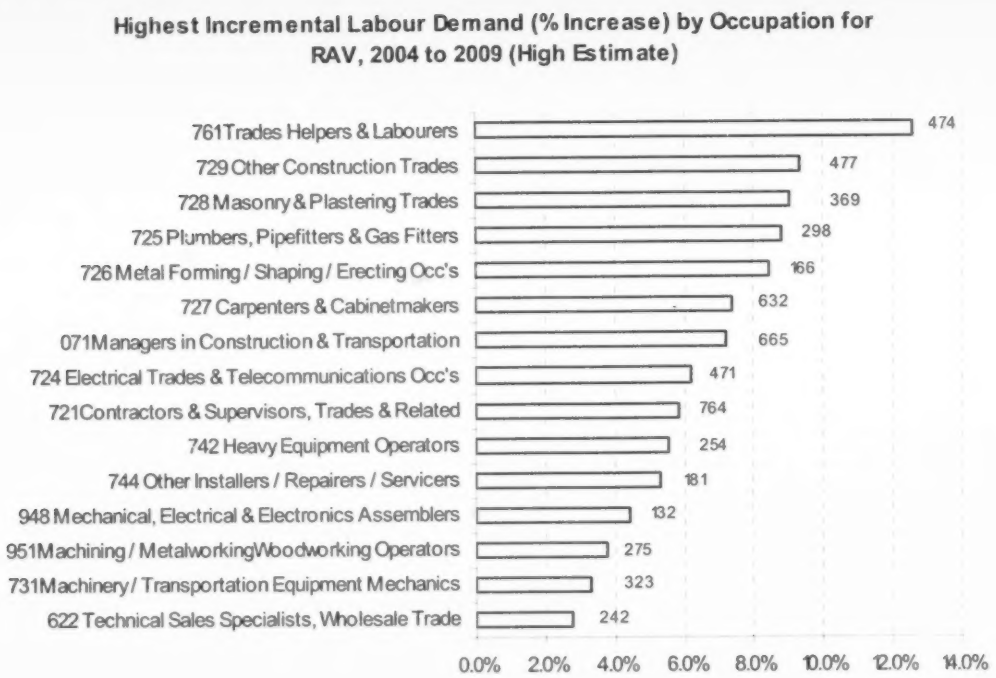
Figure 17



Occupations shown in these two Figures are also the ones expected to represent the highest percentage increase of base openings. In the Figures, the numbers next to each occupation represent the total incremental demand between 2004 and 2009.

As in the case of the Sea-to-Sky Highway upgrade project, various construction trades occupations and equipment operators are expected to experience the highest incremental increase over and above existing openings in the base model. Supervisors and Management positions in construction will also bring many additional opportunities.

Figure 18



Source for both Figures 17 and 18: See Footnote on Page 45

4.4.3 Incremental Employment Growth by Region

Because of the nature of the road construction and building up a transport system, employment impact is likely to be limited to the Lower Mainland only. It should also be emphasized that it is worth considering the possible reduced labour supplies in areas of BC outside the Lower Mainland when major projects draw workers away from them.

4.4.4 Summary

Total incremental employment demand from the Richmond-Airport-Vancouver Rapid Transit Project is estimated at between 11,957 and 14,877 over the period from 2004 to 2009. This represents approximately a 1.5 per cent increase over base job openings in the economy between 2003 and 2015. All construction is expected to be completed prior to 2010 Games.

4.5 Summary of Incremental Employment Growth of All Projects

In this section, we summarize the combined incremental employment growth due to the 2010 Olympic Games and related projects: Vancouver Convention and

Exhibition Centre expansion, the Sea-to-Sky Highway upgrade project, and the Richmond-Airport-Vancouver Rapid Transit Project.

Because the incremental impacts of the Richmond-Airport-Vancouver Rapid Transit Project are shown in a range of values, Tables and/or Figures presented in this section (except Figure 19) will also be shown in a range.

Between 2003 and 2015, combined incremental growth in each year, the number of total job openings in the base model, as well as the percentage increase of incremental over and above base openings, are summarized in Table 17 and Table 18. All detailed Tables for incremental growth from all projects by industry can be found in Appendix C, and detailed Tables for incremental growth from all projects by occupation can be found in Appendix D.

Table 17 Combined Incremental Employment Growth from the Games and Related Projects and Total Openings in Base Model, 2003 to 2015 (Low Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	373	70,152	0.5%
2004	2,048	85,038	2.4%
2005	7,110	82,285	8.6%
2006	10,635	85,211	12.5%
2007	9,655	62,103	15.5%
2008	13,843	61,856	22.4%
2009	15,598	63,533	24.6%
2010	32,882	65,506	50.2%
2011	8,438	66,056	12.8%
2012	7,312	66,775	10.9%
2013	7,452	67,507	11.0%
2014	7,087	68,252	10.4%
2015	6,446	69,011	9.3%
Total	128,879	913,285	14.1%

Source: RKA

Table 18 Combined Incremental Employment Growth from the Games and Related Projects and Total Openings in Base Model, 2003 to 2015 (High Estimate)

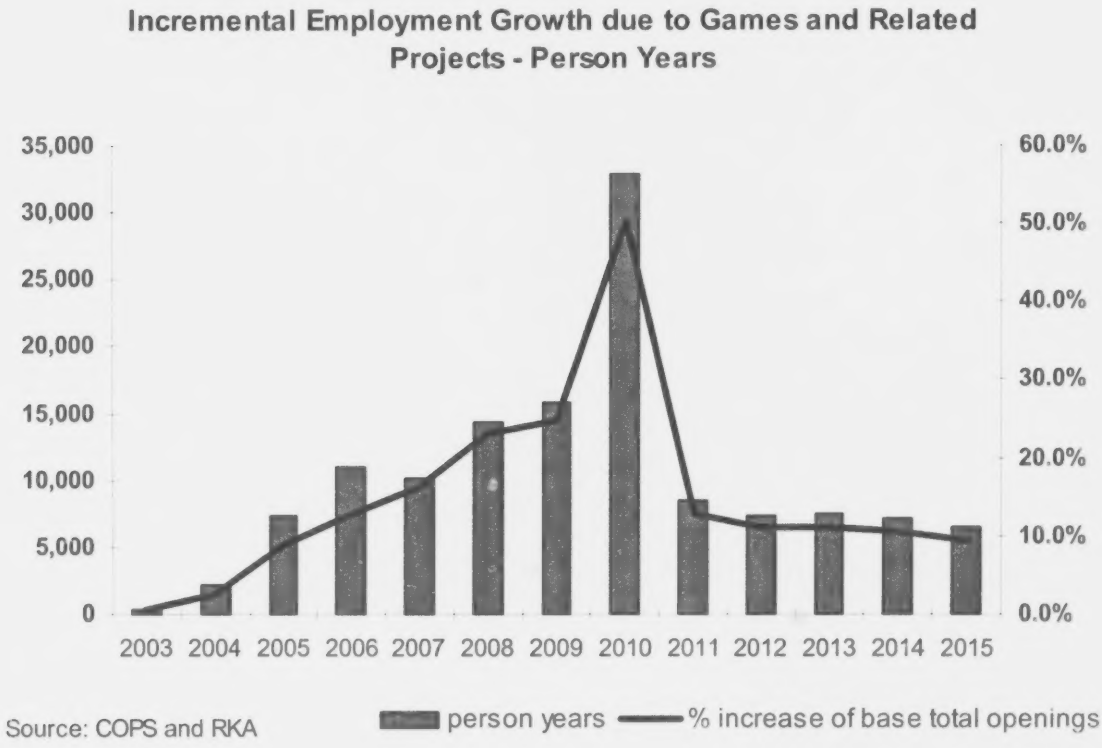
	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2003	373	70,152	0.5%
2004	2,170	85,038	2.6%
2005	7,417	82,285	9.0%
2006	11,247	85,211	13.2%
2007	10,605	62,103	17.1%
2008	14,569	61,856	23.6%
2009	15,803	63,533	24.9%

	Total Incremental Employment Growth	Total Openings in Base Model	Incremental as a % of Total Base Openings
2010	32,882	65,506	50.2%
2011	8,438	66,056	12.8%
2012	7,312	66,775	10.9%
2013	7,452	67,507	11.0%
2014	7,087	68,252	10.4%
2015	6,446	69,011	9.3%
Total	131,799	913,285	14.4%

Source: RKA

This same information is shown graphically (using one range only because the differences are negligible when shown on a graph), in Figure 19.

Figure 19



Source: COPS and RKA

4.5.1 Incremental Employment Growth by Industry

In this sub-section, we summarize our findings regarding those industries that represent the highest percentage increases over and above openings in the base model. They are also industries expected to generate the largest incremental growth.

Table 19 Incremental Employment Growth from Games and Related Projects in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015 (Low Estimate)

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Other Manufacturing	7,284	78.3%
Accommodation, Food & Recreational Services	47,854	43.4%
Construction	17,900	28.9%
Advertising	1,365	24.7%
Professional Business Services	8,190	23.7%
Communication	2,282	21.2%
Printing and Publishing	1,171	15.2%
Transportation & Storage	7,753	14.5%
Finance, Insurance, & Real Estate	5,074	10.4%
Retail Trade	10,447	9.5%
Total (incl. other industries)	128,879	14.1%

Source: RKA

Table 20 Incremental Employment Growth from Games and Related Projects in Selected Industries and Percentage Increase above Base Job Openings, 2003 to 2015 (High Estimate)

	Incremental Employment Growth	Percentage Increase of Openings in Base Model
Other Manufacturing	7,330	78.8%
Accommodation, Food & Recreational Services	47,963	43.5%
Construction	18,893	30.6%
Advertising	1,374	24.9%
Professional Business Services	8,246	23.9%
Communication	2,318	21.5%
Printing and Publishing	1,190	15.4%
Transportation & Storage	7,828	14.6%
Finance, Insurance, & Real Estate	5,179	10.6%
Retail Trade	10,634	9.7%
Total (incl. other industries)	131,799	14.4%

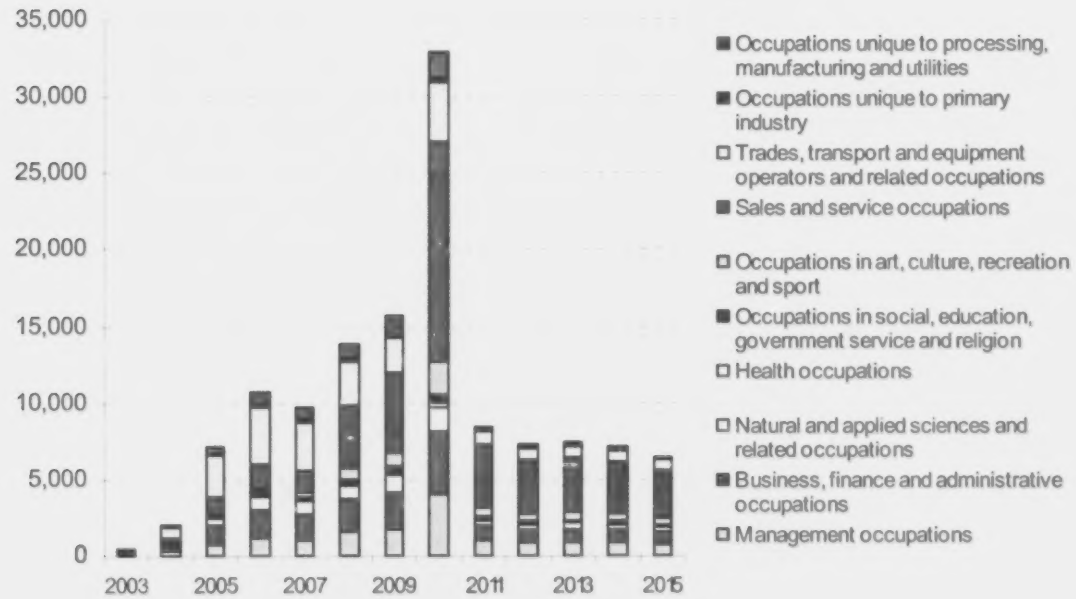
Source: RKA

4.5.2 Incremental Demand by Occupation

In this sub-section, we summarize our findings regarding occupations in demand as a result of the Games and related projects by skill type. (See Figure 20 and Figure 21.)

Figure 20

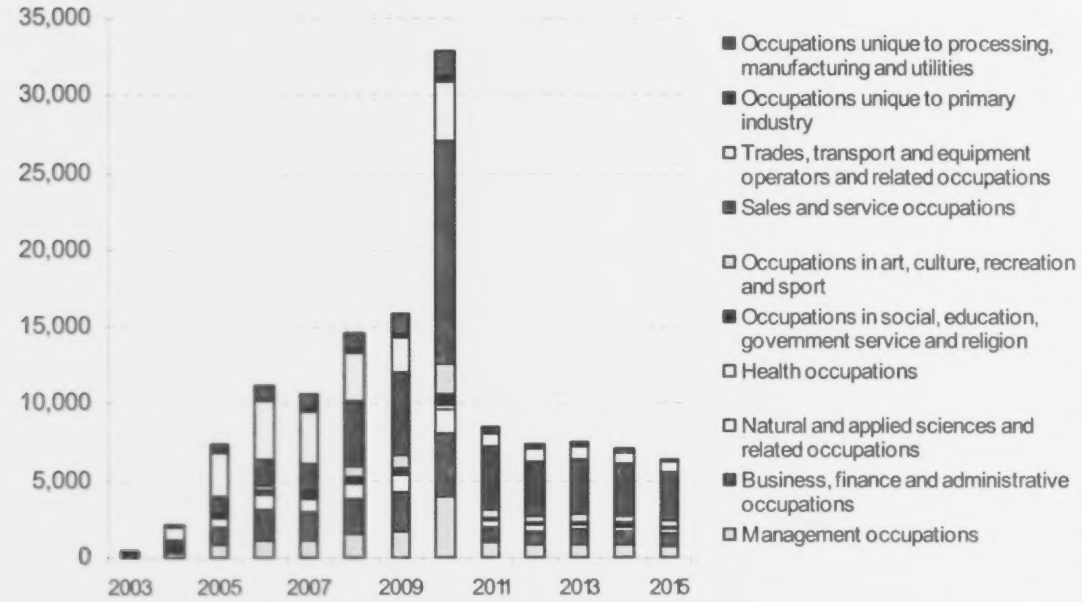
Incremental Demand by Skill Type for All Projects, 2003 to 2015 (Low Estimate)



Source: RKA

Figure 21

Incremental Demand by Skill Type for All Projects , 2003 to 2015
(High Estimate)

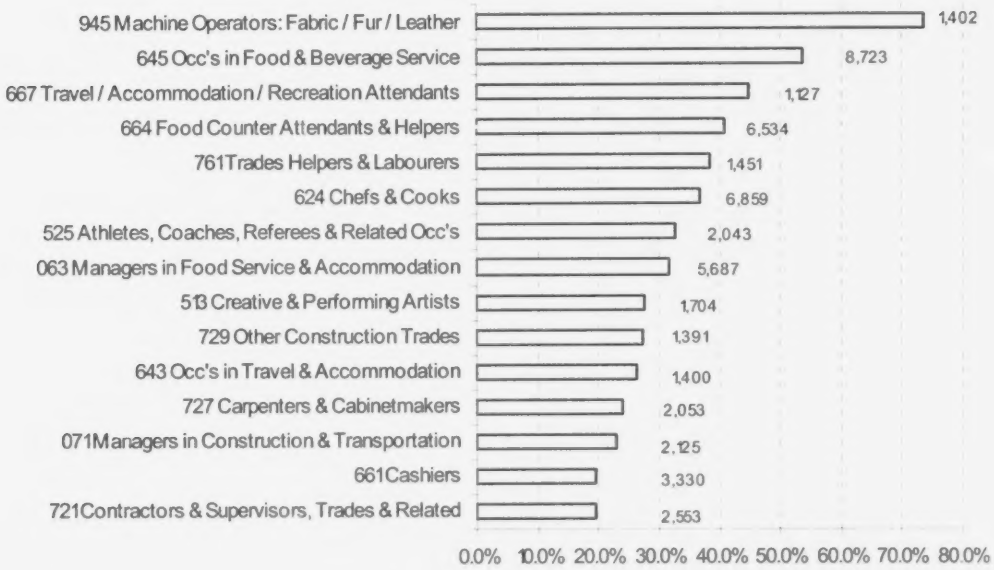


Source: RKA

We summarize in Figure 22 and Figure 23 (on the following two pages) our findings regarding those occupations that represent the highest percentage increase over and above openings in the base model. They are also occupations expected to generate the largest incremental growth.

Figure 22

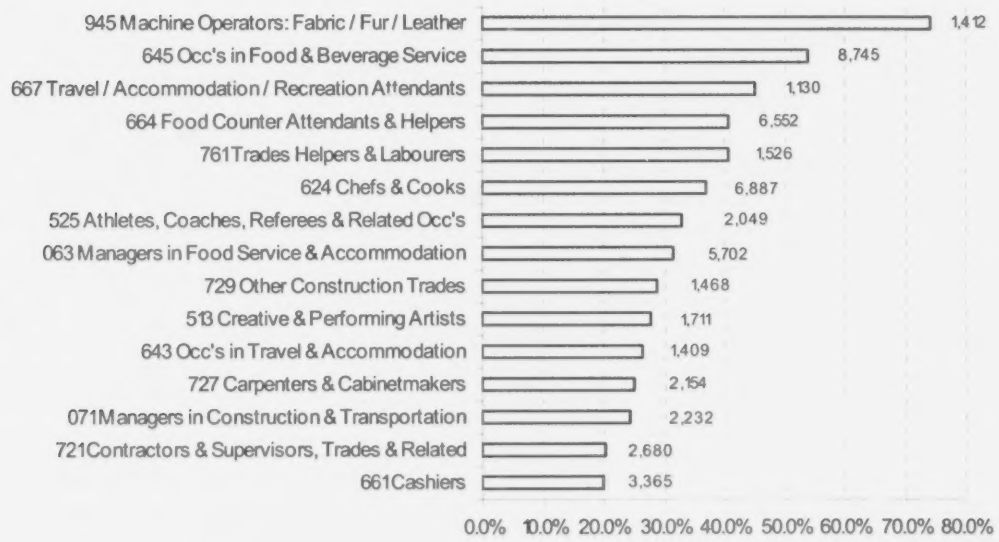
Highest Incremental Labour Demand (% Increase) for Sea-to-Sky, the Games, VCEC Expansion and RAV Projects, 2003 to 2015 (Low Estimate)



Source: RKA

Figure 23

Highest Incremental Labour Demand (% Increase) by Occupation for Sea-to-Sky, the Games, VCEC Expansion and RAV Projects, 2003 to 2015 (High Estimate)

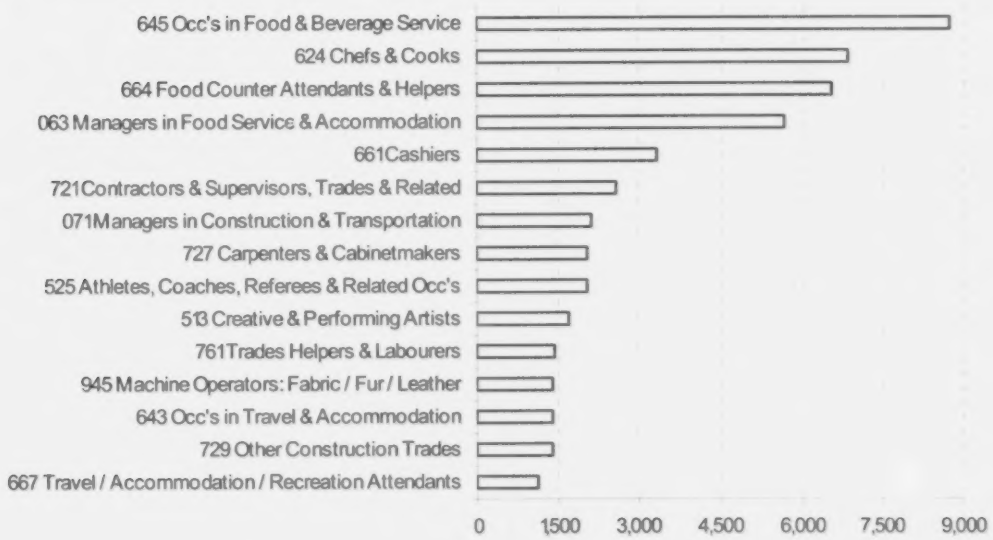


Source: RKA

We also summarize in Figure 24 and Figure 25 (on the following two pages) the top 15 occupations in order of growth in absolute numbers (as opposed to the percentage increase above base shown in Figure 22 and Figure 23).

Figure 24

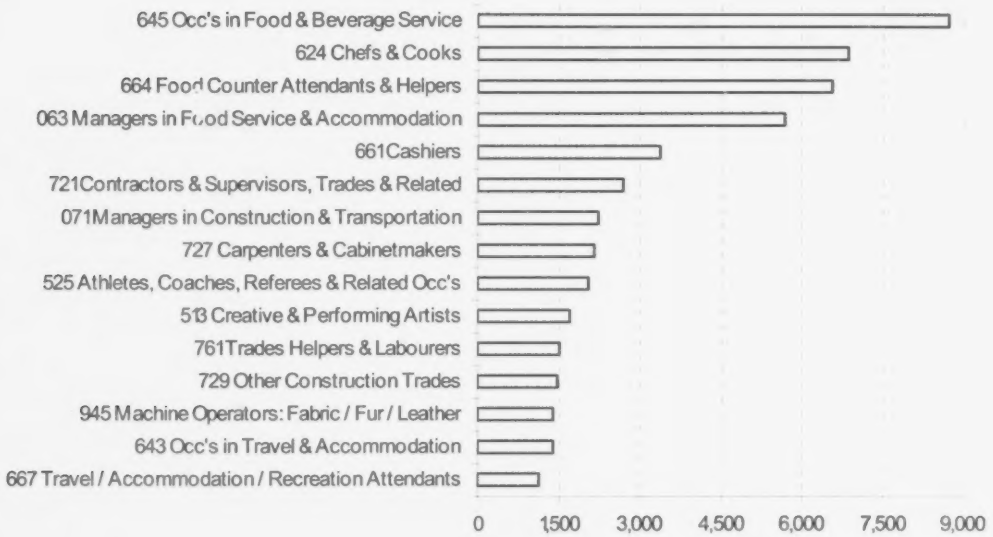
Highest Incremental Growth (in Number) by Occupation for Sea-to-Sky, the Games, VCEC Expansion and RAV Projects, 2003 to 2015 (Low Estimate)


645 Occ's in Food & Beverage Service
624 Chefs & Cooks
664 Food Counter Attendants & Helpers
063 Managers in Food Service & Accommodation
661Cashiers
721Contractors & Supervisors, Trades & Related
071Managers in Construction & Transportation
727 Carpenters & Cabinetmakers
525 Athletes, Coaches, Referees & Related Occ's
513 Creative & Performing Artists
761Trades Helpers & Labourers
945 Machine Operators: Fabric / Fur / Leather
643 Occ's in Travel & Accommodation
729 Other Construction Trades
667 Travel / Accommodation / Recreation Attendants
0
1,500
3,000
4,500
6,000
7,500
9,000

Source: RKA

Figure 25

Highest Incremental Growth (in Number) by Occupation for Sea-to-Sky, the Games, VCEC Expansion and RAV Projects, 2003 to 2015 (High Estimate)


645 Occ's in Food & Beverage Service
624 Chefs & Cooks
664 Food Counter Attendants & Helpers
063 Managers in Food Service & Accommodation
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071Managers in Construction & Transportation
727 Carpenters & Cabinetmakers
525 Athletes, Coaches, Referees & Related Occ's
513 Creative & Performing Artists
761Trades Helpers & Labourers
729 Other Construction Trades
945 Machine Operators: Fabric / Fur / Leather
643 Occ's in Travel & Accommodation
667 Travel / Accommodation / Recreation Attendants
0
1,500
3,000
4,500
6,000
7,500
9,000

Source: RKA

4.5.3 Important Common Skill Sets

There are three types of skills that one needs to develop in today's workplace:

- Career Development Skills,
- Occupation Specific Skills, and
- Employability Skills or Generic Transferable Skills

In this sub-section, we will discuss common skill sets applicable to any occupations. Readers interested in occupation specific skill sets can find information in, for example, HRDC's website

http://www15.hrdc-drhc.gc.ca/english/all_profiles.asp

or BC WorkFutures' website:

http://www.workfutures.bc.ca/EN/def/index/inoc_e1.html

Employability skills, (or generic skills, transferable skills, basic skills, core skills), are the set of skills employers identify as those needed for a high-quality Canadian workforce. They were first identified by the Conference Board of Canada in 1992. The updated list of employability skills is as follows:

- Fundamental Skills - the ability to communicate, to manage information, to use numbers, and to think and solve problems.
- Personal Management Skills - the ability to demonstrate positive attitudes and behaviours, to be responsible, to be adaptable, to learn continuously, and to work safely.
- Teamwork Skills - the ability to work with others, and to participate in projects and tasks.

These skill sets apply to any occupational groups, and can be applied and used beyond the workplace in a range of daily activities.

Skill levels of the incremental demand occupations are shown in Chapter 10, page 106.

4.5.4 Self-Employment

It is worth emphasizing that the incremental employment demand due to the Games and related projects (VCEC Expansion, Sea-to-Sky Highway Upgrade, and Richmond-Airport-Vancouver Rapid Transit Project) is expressed in person years, meaning that each person year represents one individual working full time for a whole year. In reality though, these person years would translate into many more part time, casual and/or on-call employment opportunities. They also represent not only paid employment, but also self-employment opportunities.

Self-employment is growing more and more important in many British Columbians' working lives. Using information available from 2001 Census on the share of self-employment in the labour force by occupation, we can estimate the number of self-employed for the occupations studied in this report. We summarize these estimates for each of the Games and related projects as follows. Detailed estimates for each occupation can be found in Tables D-1, D-2, D-3, D-4A and D-4B in Appendix D.

Table 21 Incremental Growth of Self-Employment from All Projects, 2003 to 2015

	Number of Self-Employed (Person Years)	Percentage of Incremental Employment Growth
2010 Games	10,614	13.8%
VCEC Expansion	4,771	15.6%
Sea-to-Sky Highway Upgrade	1,929	20.4%
RAV Low	2,221	18.6%
RAV High	2,704	18.2%
All Projects	19,535 – 20,017	15.2%

Source: RKA

4.5.5 Incremental Demand by Region

Because of the nature of the construction activities expected from the Games and related projects, the incremental employment impact is expected to remain in the Lower Mainland.

The only exception to this would be the induced tourism impact. Visitors and tourists drawn to attending the Games and other events in the first place may also be attracted to other parts of the province. Here we summarize the likely distribution of the overall incremental employment impact on tourism by Development Regions of the province.

Development Region	Share	Estimated Employment in Person Years (2003-2015)
Vancouver Island/Coast	17.9%	9,674
Mainland/Southwest	57.3%	30,943
Thompson/Okanagan	12.9%	6,966
Kootenay	4.1%	2,217
Cariboo	3.4%	1,846
North Coast	1.5%	802
Nechako	0.7%	383
Northeast	2.1%	1,133
British Columbia	100.0%	53,964

Source: BC Stats; RKA

Recommendations:

Recommendations on responding to incremental demand will be made at the end of Chapter 5 Total Labour Demand.

Chapter 5 Total Labour Demand – Base Plus Incremental Growth

In Chapter 3, we described total job openings in the province between 2003 and 2015 in the absence of the 2010 Olympic Games or related projects. In Chapter 4, we provided analysis on the incremental employment growth as a result of four infrastructure projects: the 2010 Olympic Games, the Vancouver Convention and Exhibition Centre expansion project, the Sea-to-Sky Highway upgrade project, and the Richmond-Airport-Vancouver Rapid Transit project.

In this Chapter, we will summarize total labour demand from both the base openings and combined incremental growth between 2003 and 2015. We will also compare the increase in total labour demand with employment changes of the past in order to examine the implications of such growth.

5.1 Total Labour Demand by Year

In Table 22 and Table 23, we summarize total labour demand over the period of analysis.

Table 22 Total Labour Demand in BC, 2003 to 2015 (Low Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
2003	373	70,152	70,525
2004	2,048	85,038	87,086
2005	7,110	82,285	89,396
2006	10,635	85,211	95,846
2007	9,655	62,103	71,758
2008	13,843	61,856	75,699
2009	15,598	63,533	79,132
2010	32,882	65,506	98,388
2011	8,438	66,056	74,495
2012	7,312	66,775	74,086
2013	7,452	67,507	74,959
2014	7,087	68,252	75,339
2015	6,446	69,011	75,457
Total	128,879	913,285	1,042,165

Table 23 Total Labour Demand in BC, 2003 to 2015 (High Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
2003	373	70,152	70,525
2004	2,170	85,038	87,208
2005	7,417	82,285	89,702
2006	11,247	85,211	96,458
2007	10,605	62,103	72,707
2008	14,569	61,856	76,425
2009	15,803	63,533	79,337
2010	32,882	65,506	98,388
2011	8,438	66,056	74,495
2012	7,312	66,775	74,086
2013	7,452	67,507	74,959
2014	7,087	68,252	75,339
2015	6,446	69,011	75,457
Total	131,799	913,285	1,045,085

Source: RKA

Organizing the information in a different way, total labour demand including base and incremental growth projected by source and by three distinct periods is summarized in Table 24.

Table 24 Incremental and Base Openings by Source, 2003-2015

	Pre Games Employment Demand 2003-09	During Games Employment Demand 2010	Post Games Employment Demand 2011-15
Base Openings	510,178	65,506	337,601
Total Games and Projects	59,262 to 62,182	32,882	36,735
2010 GAMES	*26,717*	*30,382*	*19,714*
VCEC Expansion	*11,139*	*2,500*	*17,021*
Sea-to-Sky Highway Upgrade	*9,449*	*0*	*0*
Richmond-Airport-Vancouver Rapid Transit Project	*11,957 to 14,877*	*0*	*0*
Total Base, Games and Projects	569,440 to 572,360	98,388	374,336

Source: RKA

5.2 Total Labour Demand by Industry

In this section, we summarize total labour demand from both the base openings and combined incremental growth between 2003 and 2015 by industry, in Table 25 and Table 26.

Table 25 Total Labour Demand in BC from 2003 to 2015 by Industry (Low Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
Agriculture	695	7,854	8,549
Fishing & Trapping	35	1,886	1,921
Logging and Forestry	186	7,111	7,297
Mining, Quarries & Sand Pits	321	2,469	2,789
Crude Petroleum, Gas Mining & Coal	17	498	515
Mining Services	18	864	882
Food Products & Beverages	800	6,731	7,530
Rubber, Plastics & Chemicals	283	3,162	3,445
Pulp and Paper, Paper Products	162	8,652	8,814
Wood	408	16,620	17,028
Printing and Publishing	1,171	7,719	8,891
Manufactured Mineral Products	438	5,532	5,971
Metal Fabrication & Machinery, except electrical	657	6,042	6,699
Motor Vehicles, Trailers & Parts	0	501	501
Other Transportation Equipment	80	6,596	6,676
Electrical & Electronic Products	269	3,723	3,992
Other Manufacturing	7,284	9,302	16,586
Construction	17,900	61,843	79,744
Transportation & Storage	7,753	53,471	61,223
Communication	2,282	10,781	13,063
Utilities	312	7,617	7,928
Wholesale Trade	4,354	51,233	55,586
Retail Trade	10,447	109,961	120,408
Finance, Insurance, & Real Estate	5,074	48,633	53,707
Advertising	1,365	5,520	6,885
Professional Business Services	8,190	34,547	42,737
Computer, Consulting and Other Business Services	4,095	67,132	71,227
Public Administration	803	29,301	30,103
Education	358	57,175	57,533
Health Services	745	113,898	114,643
Accommodation, Food & Recreational Services	47,854	110,355	158,209
Personal & Household Services	1,625	26,345	27,970
Other Services Industries	2,901	30,213	33,114
Total	128,879	913,285	1,042,165

Source: RKA

Table 26 Total Labour Demand in BC from 2003 to 2015 by Industry (High Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
Agriculture	705	7,854	8,559
Fishing & Trapping	36	1,886	1,922
Logging and Forestry	202	7,111	7,313
Mining, Quarries & Sand Pits	360	2,469	2,828
Crude Petroleum, Gas Mining & Coal	18	498	515
Mining Services	19	864	883
Food Products & Beverages	812	6,731	7,543
Rubber, Plastics & Chemicals	304	3,162	3,466

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
Pulp and Paper, Paper Products	169	8,652	8,821
Wood	436	16,620	17,056
Printing and Publishing	1,190	7,719	8,909
Manufactured Mineral Products	460	5,532	5,992
Metal Fabrication & Machinery, except electrical	880	6,042	6,922
Motor Vehicles, Trailers & Parts	0	501	501
Other Transportation Equipment	87	6,596	6,683
Electrical & Electronic Products	433	3,723	4,156
Other Manufacturing	7,330	9,302	16,632
Construction	18,893	61,843	80,737
Transportation & Storage	7,828	53,471	61,298
Communication	2,318	10,781	13,098
Utilities	320	7,617	7,936
Wholesale Trade	4,895	51,233	56,128
Retail Trade	10,634	109,961	120,595
Finance, Insurance, & Real Estate	5,179	48,633	53,812
Advertising	1,374	5,520	6,894
Professional Business Services	8,246	34,547	42,792
Computer, Consulting and Other Business Services	4,123	67,132	71,255
Public Administration	819	29,301	30,119
Education	372	57,175	57,548
Health Services	774	113,898	114,672
Accommodation, Food & Recreational Services	47,963	110,355	158,318
Personal & Household Services	1,655	26,345	28,000
Other Services Industries	2,964	30,213	33,178
Total	131,799	913,285	1,045,085

Source: RKA

5.3 Total Labour Demand by Occupation

In this section, we summarize total labour demand from both the base openings and combined incremental growth between 2003 and 2015 by occupation, in Table 27 and Table 28. We have aggregated occupations into 25 major groupings.

Table 27 Total Labour Demand in BC from 2003 to 2015 by Occupation (Low Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
0 Management Occupations	14,809	95,756	110,564
11 Professional Occupations In Business And Finance	3,782	36,284	40,066
12 Skilled Administrative And Business Occupations	6,124	56,486	62,610
14 Clerical Occupations	8,268	66,423	74,690
21 Professional Occupations In Natural And Applied Sciences	4,419	45,046	49,465
22 Technical Occupations Related To Natural And Applied Sciences	3,269	25,012	28,281
31 Professional Occupations In Health	351	28,627	28,978
32 Technical And Skilled Occupations In Health	266	13,266	13,532
34 Assisting Occupations In Support Of Health Services	167	16,388	16,554
41 Professional Occupations In Social Science, Education, Government Services And Religion	2,252	58,101	60,353
42 Paraprofessional Occupations In Law, Social Services, Education And Religion	778	10,510	11,288
51 Professional Occupations In Art And Culture	2,443	11,942	14,385
52 Technical And Skilled Occupations In Art, Culture, Recreation And Sport	4,079	16,267	20,345
62 Skilled Sales And Service Occupations	12,892	67,039	79,931

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
64 Intermediate Sales And Service Occupations	15,954	91,993	107,947
66 Elemental Sales And Service Occupations	17,108	82,468	99,576
72-73 Trades And Skilled Transport And Equipment Operators	13,908	76,137	90,046
74 Intermediate Occupations In Transport, Equipment Operation, Installation And Maintenance	7,706	50,932	58,638
76 Trades Helpers, Construction Labourers And Related Occupations	1,566	4,370	5,936
82 Skilled Occupations In Primary Industry	1,070	13,362	14,432
84 Intermediate Occupations in Primary Industry	353	3,144	3,496
86 Labourers In Primary Industry	677	2,861	3,538
92 Processing, Manufacturing And Utilities Supervisors And Skilled Operators	752	6,548	7,300
94-95 Processing And Manufacturing Machine Operators And Assemblers	4,896	27,495	32,391
96 Labourers In Processing, Manufacturing And Utilities	993	6,828	7,820
Total	128,879	913,285	1,042,165

Source: RKA

Table 28 Total Labour Demand in BC from 2003 to 2015 by Occupation (High Estimate)

	Total Incremental Employment Growth	Total Openings in Base Model	Total Growth in Labour Demand
0 Management Occupations	15,140	95,756	110,896
11 Professional Occupations In Business And Finance	3,833	36,284	40,118
12 Skilled Administrative And Business Occupations	6,277	56,486	62,763
14 Clerical Occupations	8,494	66,423	74,917
21 Professional Occupations In Natural And Applied Sciences	4,524	45,046	49,570
22 Technical Occupations Related To Natural And Applied Sciences	3,369	25,012	28,381
31 Professional Occupations In Health	360	28,627	28,987
32 Technical And Skilled Occupations in Health	272	13,266	13,538
34 Assisting Occupations In Support Of Health Services	172	16,388	16,560
41 Professional Occupations In Social Science, Education, Government Services And Religion	2,285	58,101	60,386
42 Paraprofessional Occupations In Law, Social Services, Education And Religion	785	10,510	11,296
51 Professional Occupations In Art And Culture	2,458	11,942	14,400
52 Technical And Skilled Occupations In Art, Culture, Recreation And Sport	4,101	16,267	20,368
62 Skilled Sales And Service Occupations	13,056	67,039	80,095
64 Intermediate Sales And Service Occupations	16,175	91,993	108,168
66 Elemental Sales And Service Occupations	17,255	82,468	99,723
72-73 Trades And Skilled Transport And Equipment Operators	14,591	76,137	90,728
74 Intermediate Occupations In Transport, Equipment Operation, Installation And Maintenance	7,927	50,932	58,859
76 Trades Helpers, Construction Labourers And Related Occupations	1,644	4,370	6,014
82 Skilled Occupations In Primary Industry	1,107	13,362	14,469
84 Intermediate Occupations in Primary Industry	362	3,144	3,506
86 Labourers In Primary Industry	694	2,861	3,554
92 Processing, Manufacturing And Utilities	789	6,548	7,338

Supervisors And Skilled Operators			
94-95 Processing And Manufacturing Machine Operators And Assemblers	5,102	27,495	32,597
96 Labourers In Processing, Manufacturing And Utilities	1,027	6,828	7,855
Total	131,799	913,285	1,045,085

Source: RKA

Therefore we can see that between 2003 and 2015, employment will grow in BC by between 1,042,000 and 1,045,000 jobs. Of this, 128,900 to 131,800 jobs, or approximately 12.5 percent, will be due to the Games and related projects.

5.4 Comparison of Projected Increase in Labour Demand with Past Employment Growth

Incremental employment growth due to the Games and related projects is expected to be about 130,000 person years between 2003 and 2015. Total openings in the base model (i.e. from growth and from attrition) are projected to be around 913,000. So the total incremental increase in labour represents approximately a 14% increase above total openings in the base scenario.

Putting this into the context of employment growth over the previous 13 years may help to understand from past experience whether such growth in the near future is likely to pose serious challenges to the province's labour market and training system.

The 913,285 projected total openings in the base model between 2003 and 2015 include 354,990 net new openings (openings to meet labour demand from increased economic activities) and 558,295 replacement job openings. For comparison purposes, we looked at the net employment growth available for BC during the previous 13 years from the Labour Force Survey[29]. It is 464,500. Although we do not have information about attrition in these same years, it is almost certain that replacement job openings in the past were smaller than those projected as we face an aging workforce.

Such net growth from the base model, combined with incremental employment growth due to the Games and related projects, would generate a total of approximately 485,000 new openings between 2003 and 2015, excluding replacement jobs. At first glance, this is only slightly more than the employment growth of 464,500 jobs in the previous 13 years, and the labour market should easily accommodate it. However, there are reasons to be concerned. First, as discussed earlier such incremental employment demand due to the Games and related projects will be concentrated around the Games year and in a few industries, thus creating a great pressure for these industries to recruit sufficiently early to ensure their needs will be met. Second, incremental employment growth here (130,000) is expressed in person years, each person year being equivalent to one person working full time for a whole year. That means that in reality there

[29] Note that the Labour Force Survey does not provide information about attrition, or replacement jobs.

are likely going to be many more openings as some jobs will only be part-time or part-year. Third, as we face an increasingly aging workforce, the need to just fill those replacement jobs is going to get more difficult the further we move into the projection period.

For these reasons, it is important to adopt a pro-active and coordinated human resource planning strategy to ensure such demand can be met.

5.5 Recommendations

5.1 Using these results, begin planning for labour needs early. Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply, as we have described in the report.

5.2 Start training programs now. Involve all players, governments, unions, employers, educational institutions, First Nations.

Chapter 6 First Nations—Supply and Demand

We have looked at demand in the preceding Chapters. A few Chapters ahead we will look at supply, but in this Chapter and the next we will consider two groups that the Olympic Bid specifically mentions. In this Chapter we will consider First Nations; in the next, the inner city neighbourhoods.

The Olympic Bid Book acknowledges that the four First Nations governments most directly involved in the Bid to host the 2010 Winter Games are the Lil'wat (Mt. Currie) Nation, Musqueam Nation, Squamish Nation and the Tsleil-Waututh (Burrard) Nation. Each Nation is represented on the Vancouver 2010 Board of Directors and one First Nation (Lil'wat) representative is a member of the Executive Committee.

First Nations' distinct relationship with the Games and related projects is based in part on the fact of their taking place in areas claimed by local First Nations as traditional territories. First Nations' support and participation will enhance the goal of making the Games achieve the highest standard.

Aboriginal people are also a key potential source of labour for the Olympics, and for the projects that will proceed prior to and during the Games. As a group whose proportion of the population and role in society is increasing, it is appropriate to focus on First Nations as a distinct part of the potential work force from which the labour supply for these major projects could be drawn.

With their support and participation in these initiatives, Aboriginal people have understandable expectations of skills development, business growth, employment opportunities (both direct and indirect), new partnership ventures, and greater educational opportunities. The First Nations can be a source of needed employees, contractors, suppliers and volunteers. Participation will help build lasting relationships. The inclusion, representation and participation of the First Nations in the Games and related projects are essential. In our review of literature from past Games and similar events, we found no striking examples of successful approaches to creating opportunities for First Nations and Indigenous people (perhaps because the format of material on past events does not highlight such aspects). It would be useful, during the labour supply work to follow, to conduct a further search for other successful practices.

6.1 Shared Legacies Agreement

The Vancouver 2010 Bid Corporation with two First Nations; Squamish and Lil'Wat, have signed the "Shared Legacies" agreement, whose objective (in addition to respecting the Nations' presence and protecting title) is to take advantage of economic opportunities.

Included in the agreement are a multi-million dollar Skills and Training Legacy Project (the Skills Legacy) to enhance training and capacity building for the Nations. Then there is the construction of a major Squamish and Lil'wat Cultural Centre near Whistler; and other parts of the agreement concern properties that will be legacies of the Games, some of them recreational developments.

In addition, the Legacies Agreement sets out distinct commitments regarding Economic Opportunities: a guarantee of contracting opportunities for the Nations and an assurance that significant contracts in the Callaghan Valley will be directly undertaken by the Nations; a commitment that the OCOG (Organizing Committee of the Olympic Games) procurement policy will be developed and approved by the OCOG Board (which will include at least one nominee from the Nations); and finally a statement of types of contracting opportunities envisaged: such projects as trail clearing, trail legacy construction, environmental works to mitigate or avoid negative impacts, processing of timber on site, supplying and/or constructing pre-fab or log homes for the Village, supplying material and/or construction of the day lodge, replanting (including silviculture) and site restoration, pursuant to the OCOG procurement policy.

Human Resources Development plans of the Nations reflect training and career choice strategies that are geared to the kinds of opportunities described in the Legacies Agreement, as well as realization of the large number of jobs implicit in the construction activity over the period of the Games, and indirect and induced impacts such as increased tourism, etc.

Even the Aboriginal youth sports legacy endowment fund, for the use of all Aboriginal youth in British Columbia in pursuing excellence in sports, will undoubtedly have some labour market implications, as initiatives on the scale of the Games develop significant professional and recreational sports opportunities. The Province will seek to resolve a separate agreement with the Nations on other issues such as the Sea to Sky Highway upgrades.

6.2 2010 Olympic Bid and First Nation Training & Employment Initiatives

Another major initiative is an Economic Measures[30] Agreement for the 2010 Olympic Bid and First Nation Training & Employment Initiatives. Signed with three of the First Nations which are parties to the Bid[31], this agreement creates working partnerships between First Nations, local government and industry, and increases First Nations involvement and capacity in a number of sectors where there are currently occupational gaps. More specifically, there is a major shortage of Aboriginal people educated in a number of fields including community planning and development, business management and resource conservation,

[30] An agreement under the BC government's multi-million dollar Economic Measures Fund to support economic development projects involving First Nations; administered by the Treaty Negotiations Office. See: http://www2.news.gov.bc.ca/nrm_news_releases/2003TNO0003-000112-Attachment1.htm

[31] Squamish, Lil'wat (Mt. Currie) and Musqueam.

science-related fields and engineering. Aboriginal learners are currently underrepresented in post-secondary education institutions throughout the province. This initiative also works towards addressing that issue.

The agreement explicitly makes the outcomes of this Labour Demand Analysis a guide to its choices, but it uses information already available on the Sea-to-Sky Upgrade project, and includes plans to develop and implement Training Plans specific to the Sea-to-Sky Initiative for each community. (Examples of targeted occupations: labour, skilled trades such as carpenters, iron workers, electricians, supervisors and foremen, equipment operators, engineers, planners, drafters). Other components are: an Environmental Management Training and Employment Initiative and a Long-Term Training and Employment Initiative taking into account results of this labour demand analysis. The agreement sets out structured programs of training, apprenticeship, partnerships, and placement for candidates.

Again, the Training and Employment Initiatives are quite complementary to existing HR plans and strategies of the four First Nations; all of them address occupational ranges that coincide well with opportunities in tourism, retail and food services, skilled trades, environmental and recreational occupations, and development of entrepreneurship.

There is also a Coordinated Aboriginal Apprenticeship Strategy, another large, multi-year project (not tied to the Olympics and related projects) to increase Aboriginal participation in the Vancouver area trades sector. In the coming three years, the project has a goal of creating employment and training opportunities for 200 Aboriginal people in Vancouver area trades labour markets, of whom 80 will be encouraged to acquire formal apprenticeship training. This project is aimed at addressing a potential skills shortage of tradespeople under the "base" scenario, although it gives acknowledgement to the possibility of Olympics-generated activity. Many of the trades that it targets coincide with the list of incremental demand occupations[32]. With its Assessment, Needs Analysis, Assistance Programs and Services, Placement and Aftercare components, the project potentially targets residents of the Downtown Eastside as well. It also has an Awareness Promotion component, which a number of sources have identified as important for First Nations youth. It would be well to consider increasing the size and scope of this Strategy, with additional budget to take full advantage of opportunities stemming from the Games and related projects.

In summary, a good many initiatives are already underway, including the First Nations' own HR planning and programming, which appear to target quite well some of the areas for growth we have identified in Chapters 3-5. It is apparent that First Nations' employment development activities are ongoing, guided by an awareness of the labour market.

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[32] Examples: Plumber, Mechanics, various Installers, Welders, Equipment Operators, Carpenters, Drywallers, Piledriver and Bridge workers, Electricians, others.

In the HR planning that we have seen, there seem to be some very good matches with coming opportunities: construction and apprenticeable trades, clerical and office workers, tourism-related training and business skills, environmental workers, as well as training in hospitality, some retail, and healthcare. First Nations plans also include strategies for increasing the number of workers in management in construction, engineering, in tourism/retail – all areas ripe for consideration.

Key informants from the First Nations identified that it can be challenging to apply some of the labour market information they have, in the face of other pressures on young people, but they are attuned to both labour market conditions and the needs of their clientele. We hope that they will be able to apply the information on occupational demand in this analysis to confirm their existing targets and directions, as well as perform a detailed analysis of supply, in order to adjust and in some cases set new ones. The availability of Labour Market Information particularly focused on First Nations issues is quite limited. With the number of initiatives and programs, and the likelihood of fast-paced change in the general economy in the event of the Games and related projects, the need for co-ordination will grow.

6.3 First Nations' Representation in the Experienced Labour Force

Table 29 and Table 30 (beginning next page) show information provided by Don McRae, Director, BC Stats, Ministry of Management Services. It is 2001 Census data for Aboriginal and non-aboriginal members of the labour force. We have chosen the total for BC, and the same data for the "Lower Mainland/South Coast" development region. (Other regions were also provided.) The centremost two columns show the proportion of employment by Aboriginal and non-Aboriginal people in each industry, and the right two columns show the distribution of employment by industry for both the Aboriginal and non-Aboriginal people, in each of these two regions.

Table 29 Share of Employment and Distribution of Employment by Industry – BC – Aboriginal and Non-aboriginal

In Labour Force – Experienced —BC	Share of Employment by Industry		Distribution of Employment	
	Aboriginal Identity Share	Non-Aboriginal Identity Share	Aboriginal Identity	Non-Aboriginal Identity
Total - Industry - 1997 North American Industry Classification System[33]	3.4%	96.6%	100.0%	100.0%
11 Agriculture forestry fishing and hunting	8.3%	91.7%	9.4%	3.7%
21 Mining and oil and gas extraction	5.4%	94.6%	1.1%	0.7%
22 Utilities	2.3%	97.7%	0.4%	0.6%
23 Construction	4.2%	95.8%	7.1%	5.8%
31-33 Manufacturing	3.4%	96.6%	9.6%	9.6%
41 Wholesale trade	1.8%	98.2%	2.2%	4.2%
44-45 Retail trade	2.8%	97.2%	9.3%	11.6%
48-49 Transportation and warehousing	3.2%	96.8%	5.2%	5.7%
51 Information and cultural industries	1.6%	98.4%	1.4%	3.1%
52 Finance and insurance	1.4%	98.6%	1.6%	4.1%
53 Real estate and rental and leasing	1.7%	98.3%	1.0%	2.1%
54 Professional scientific and technical services	1.4%	98.6%	2.7%	6.9%
55 Management of companies and enterprises	2.2%	97.8%	0.0%	0.1%
56 Administrative and support waste management and remediation services	4.3%	95.7%	5.0%	4.0%
61 Educational services	2.9%	97.1%	5.8%	7.0%
62 Healthcare and social assistance	3.4%	96.6%	9.7%	9.9%
71 Arts entertainment and recreation	4.1%	95.9%	2.7%	2.3%
72 Accommodation and food services	3.7%	96.3%	8.8%	8.3%
81 Other services (except public administration)	3.4%	96.6%	4.8%	4.9%
91 Public administration	7.4%	92.6%	12.1%	5.4%
Agriculture Food and Beverage	3.1%	96.9%	2.7%	3.0%
Fishing and Fish Processing	18.5%	81.5%	2.8%	0.4%
Logging and Forest Products	7.7%	92.3%	10.6%	4.5%
Mining and Mineral Resources	3.3%	96.7%	1.9%	2.0%
Non-Resource-Based Manufacturing	1.8%	98.2%	2.1%	4.0%
Transportation Storage and Utilities	3.1%	96.9%	5.6%	6.3%
Communication Business Amusement and Recreation and Personal Services	2.7%	97.3%	16.7%	21.3%
Wholesale and Retail Trade	2.5%	97.5%	11.4%	15.8%
Finance Insurance and Real Estate	1.5%	98.5%	2.6%	6.2%
Public Services	4.2%	95.8%	27.6%	22.3%

Source: 2001 Census, Statistics Canada

[33] In these tables, the numbered groupings are NAICS; the unnumbered groupings are selected regroupings (only part of the full NAICS range) for convenience of understanding certain industry groupings

Table 30 Share of Employment and Distribution of Employment by Industry – Lower Mainland-Southwest – Aboriginal and Non-aboriginal

In Labour Force – Experienced — Lower Mainland – Southwest	Share of Employment by Industry		Distribution of Employment	
	Aborig-inal Identity Share	Non-Aborig-inal Identity Share	Aborig-inal Identity	Non-Aborig-inal Identity
Total - Industry - 1997 North American Industry Classification System	1.9%	98.1%	100.0%	100.0%
11 Agriculture forestry fishing and hunting	3.3%	96.6%	1.2%	1.3%
21 Mining and oil and gas extraction	2.3%	97.7%	0.1%	0.1%
22 Utilities	1.5%	98.6%	0.1%	0.3%
23 Construction	2.9%	97.1%	2.7%	3.3%
31-33 Manufacturing	1.6%	98.4%	2.6%	5.8%
41 Wholesale trade	1.3%	98.7%	1.2%	3.1%
44-45 Retail trade	1.7%	98.3%	3.2%	6.8%
48-49 Transportation and warehousing	1.9%	98.1%	2.0%	3.7%
51 Information and cultural industries	1.1%	98.8%	0.8%	2.4%
52 Finance and insurance	0.9%	99.1%	0.8%	2.9%
53 Real estate and rental and leasing	1.2%	98.8%	0.5%	1.4%
54 Professional scientific and technical services	0.8%	99.2%	1.2%	5.0%
55 Management of companies and enterprises	0.0%	100.0%	0.0%	0.1%
56 Administrative and support waste management and remediation services	2.8%	97.2%	2.0%	2.6%
61 Educational services	1.7%	98.3%	2.0%	4.2%
62 Healthcare and social assistance	2.0%	98.0%	3.3%	5.7%
71 Arts entertainment and recreation	2.5%	97.5%	1.0%	1.4%
72 Accommodation and food services	2.1%	97.9%	2.9%	4.8%
81 Other services (except public administration)	2.1%	97.9%	1.8%	3.0%
91 Public administration	4.6%	95.4%	3.6%	2.6%
Agriculture Food and Beverage	1.4%	98.6%	0.7%	1.7%
Fishing and Fish Processing	5.2%	94.7%	0.4%	0.2%
Logging and Forest Products	3.9%	96.1%	1.4%	1.2%
Mining and Mineral Resources	1.5%	98.4%	0.4%	0.9%
Non-Resource-Based Manufacturing	1.2%	98.8%	1.1%	3.1%
Transportation Storage and Utilities	1.8%	98.1%	2.1%	4.1%
Communication Business Amusement and Recreation and Personal Services	1.7%	98.3%	6.8%	14.4%
Wholesale and Retail Trade	1.6%	98.4%	4.4%	9.8%
Finance Insurance and Real Estate	1.0%	99.0%	1.2%	4.3%
Public Services	2.5%	97.5%	8.9%	12.5%

Source: 2001Census, Statistics Canada

When we look at these two tables, the most revealing columns are the two furthest right, showing the distribution of employment within each population. For instance, in the BC-wide comparison (Table 29), a greater percentage of the Aboriginals' labour force is involved in 11 Agriculture forestry fishing and hunting (9.4%) than the Non-aboriginals' (3.7%). Similar differences show for 21 Mining, etc (1.1% vs. 0.7%), and the unnumbered groupings Logging and forest products (10.6% vs. 4.5%) and Fishing and Fish Processing (2.8% vs. 0.4%).

Looking at the Lower Mainland-Southwest (Table 30) on the other hand, the share of the distribution in these industries drops for both groups, and the difference between them diminishes (11 Agriculture forestry fishing and hunting 1.2% vs. 1.3%; 21 Mining etc. 0.1% and 0.1%; Logging and forest products 1.4% vs. 1.2%; Fishing and Fish Processing 0.4% vs. 0.2%).

Two industry groupings show a sharp reversal moving from the province as a whole to the Lower Mainland area: construction accounts for 7.1% of the aboriginal labour force vs. 5.8% of the non-aboriginal in all of BC, but in the Lower Mainland-Southwest it is only 2.7% vs. 3.3%. And 31-33 Manufacturing, while it is 9.6% of both groups' labour force for the province, declines to 2.6% for Aboriginals vs. 5.8% for Non-aboriginals in the Lower Mainland region. In fact, a preponderance of industries show a lower percentage for the Aboriginal group than the Non-aboriginal. These imbalances, if they are corrected, will provide opportunities for gains by Aboriginals. Notable among the industries are some from the incremental growth areas: 41 Wholesale trade, 31-33 Manufacturing in the Lower Mainland region, 48-49 Transportation and warehousing, 52 Finance and insurance, 72 Accommodation and food service, besides several others.

These areas coincide to some degree with the focus of the above-mentioned agreements and First Nations HR plans. They also coincide very well with areas of opportunity identified earlier in the demand analysis. Shifting the balance into greater labour force share by Aboriginals is clearly needed in a number of significant industries in BC.

6.4 Education

While a significant and growing number of First Nations people have post-secondary education, a larger proportion than other British Columbians have not completed high school. The disparity between Aboriginals and non-aboriginals in the Kindergarten to Grade 12 completion rate has a historic existence, although it has been improving recently.[34]

In order to acquire long-term marketable skills, high school level education is virtually mandatory in the labour market. It is essential to address the need for this level of education, if the goal of labour market participation is to be realistic. Very few of the occupations projected for either the base or incremental growth

[34] *How Are We Doing? Demographics and Performance of Aboriginal Students in BC Public Schools* (BC Ministry of Education, July 2002).

are purely "unskilled" or Skill level "D".[35] A fundamental need is for ongoing programs which enable adults to complete high school.

6.5 Career Choice

For the young, and for anyone who wants to move into the labour market or improve attachment to it, career path considerations are paramount, and career choice decisions need to be made. Looking at the Games and related projects, it becomes important for career choices to be made in time to capitalize on the new opportunities. These can include decisions to make a change (any level), or start (entry-level) work with an attainable goal in mind. Paths will exist in large numbers for careers in management in retail, tourism, accommodation, for supervision in construction and the trades. Also there is a wealth of entrepreneurial opportunity opening up. The analytic and decision-making tools to support the right choice are essential.

For those who have not completed high school, entry level retail and hospitality present themselves here – not as "dead-end" jobs but with a great need for managers; therefore career paths are possible. The industries themselves are realizing that appealing to potential workers, and retention, can only be fostered by career path awareness. This has to be promoted both in the industry and in the target labour supply population. Such career path decisions imply career choice. Career counseling is an important initiative for matching opportunities to the labour supply – to fill a gap.

6.6 Recommendations

Below are our recommendations regarding First Nations—Supply and Demand.

6.1 Ensure full participation and consultation with First Nations in developing and implementing any programs that flow from the Games and related projects, to ensure applicability, and to integrate with extensive and well-developed plans and strategies already in place.

6.2 Conduct a search for examples of successful practices in creating opportunities for First Nations and Indigenous people, in literature about past Games and similar events.

6.3 Continue to facilitate the acquisition of seats for trades training. Some First Nations (e.g. Squamish) have already acquired seats for equipment operators, but with the analysis in 2 above, there would probably be a decision to target other kinds of skills too.

6.4 Determine the needed level and put in place adequate adult education training and career choice assistance for First Nations.

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[35] The lowest Skill Level of the National Occupational Classification.

Chapter 7 —Vancouver's Inner-city Neighbourhoods— Supply and Demand

In this Chapter we will consider a second major group to receive specific attention from the 2010 Games' Bid Corporation and its member partners. The Vancouver 2010 Olympic Bid includes a formal Intent Statement ensuring the event is an "inclusive" Games. This means the 2010 Bid Corporation has pledged to address actively the concerns of those living in inner-city communities during the planning and implementation of the Games. A Commitment Statement following from that includes working with the community to ensure both short and long-term jobs are created for local communities.

During the organizing phase, measures will be developed to support the goals and objectives in the Commitment Statement, for sustainable socio-economic development in Vancouver's inner-city neighbourhoods.

The Commitment Statement, which includes the following goals and objectives, has been adopted by The Vancouver 2010 Bid Corporation and its Member Partners:

Business Development

a) Develop opportunities for existing and emerging local inner-city businesses and artisans to promote their goods and services

b) Develop potential procurement opportunities for businesses that employ local residents

Employment and Training

a) Create training and a continuum of short and long-term employment opportunities for inner-city residents to encourage a net increase in employment

b) Provide reasonable wages and decent working conditions for any local worker producing Games related goods and services before and during the Winter Games

Some information about the people living in the inner-city communities comes from analyses prepared by Ference Weicker & Company. The population of the region is 16,275, Ference Weicker tells us (1996 Census figure). It tends to be older, single, male, and more likely to be renters, compared with the rest of the city. Participation and employment rates are also much lower. Ference Weicker's report Phase *II of the Economic Capacity Study* also provides the following

"Factors such as the age of the residents, mental illness, alcohol, drug and life skills issues, and economic conditions have contributed to low labour market participation rates."

"In 1996, only about 6,000 of the 16,000 residents (39%) counted themselves as being in the work force of whom 73% were employed and 27% were unemployed on Census Day."

The local population also tends to be much less educated and have a higher rate of mental illness as well as drug and alcohol abuse.

The highest level of education of 46% of residents was less than high school completion (as compared to about 15% of Vancouver's population) and 10% have a university degree (as compared to 20% of the Vancouver population). The region accounts for 20% of the mental heath cases per month in Vancouver.

— Ference Weicker & Company, *Phase II of the Economic Capacity Study*, p. 9.

"Sixty-eight percent of the population is considered to be in the low income category and the area has the lowest per capita income of any urban area in Canada."

On the demand side in the area, we learn:

"There are approximately 2,300 organizations (establishments) operating in the area, employing more than 20,000 people. "

but

"The regional linkages between the employers surveyed, local residents and local suppliers are limited. Most of the people who are employed in the region do not reside in the region. ...The opportunities for employment and training are declining. As the economy of the Downtown Eastside weakens, the number of local employment opportunities open to local residents also declines."

These factors make it difficult to generalize about the inner city population as a source of supply, in relation to the labour demand we have identified in Chapters 3-5. There is not a detailed analysis of the group's job-related attributes, such as level of education, experience, skills, etc. One broad generalization is that, with 46% of residents having less than high school completion, suitable entry-level jobs are of interest. The base and incremental demand occupations with skill level D (which the NOC tells us require up to two years of secondary school and short work demonstration or on-the-job training) include 667 Travel & Recreation Attendants (includes various sports attendants, icemakers and such travel jobs as porters, bellhops, luggage handlers), 661 Cashiers, 666 Cleaners and 761 Trades Helpers and Labourers. Key informants emphasize the need to take

incremental steps in bringing many long-term unemployed into the workforce, and point to the possibility of building from skill level D work to higher-skilled trades with planning and support.

On the other hand, it may be that generalizing about this group is not optimal, and that labour supply issues are best dealt with in small groupings, or individually, by service providers and community partners, etc., as described in the material provided by Fast Track to Employment. A number of our key informants in government and agencies indicated awareness of the need for service-intensive approaches to some groups.

The Vancouver Agreement

The Vancouver Agreement is a commitment made in 2000 by the federal government, the Province of BC, and the City of Vancouver to work together to support sustainable economic, social and community development in Vancouver. Although the agreement affects the entire city, the initial focus of work is in the Downtown Eastside.

The Vancouver Agreement Employment Strategy Working Group designed an Employment Strategy which has recently been adopted by the 3 levels of government. Its focal point will be to tackle the most difficult employment issue—namely, the situation facing the long term unemployed. According to the Working Group, this target population is around 2000 (that is 12% of the Downtown Eastside's population, or roughly a third of the self-identified workforce participants). The Working Group is confident it is possible for up to 700 to become employed over 3 years (2003-2006) – as opposed to fewer than 100 per year now. Many have deep rooted barriers that it would take years to overcome. The individualized approach the Strategy will take includes the following steps:

- Assessment
- Address gap/barriers
- Pre-employment - basic work skills
- Skills and trades training
- Address problems of access of services that exist already
- Six-point policy changes proposal to overcome policy barriers.

Another useful Ference Weicker Report, the *Community Assessment*[36], recommends an action that can be done after "the projected demand and supply

[36] *Vancouver Agreement: Community Assessment of 2010 Olympic Winter Games and Paralympic Games on Vancouver's Inner-City Neighbourhoods*, February 2003.

of workers related to the Games" (this study and its supply-side counterpart) are completed:

"*Prepare an employment strategy for residents of the inner-city neighbourhoods*"

—Ference Weicker *Community Assessment* Report

Such a strategy may well include a more detailed look at the employability characteristics of the neighbourhoods' populations, either as a group or individually, in light of the detailed analysis of demand/supply.

It would be useful as well to revisit the profile of the population that Ference Weicker prepared, using 2001 Census Results, available soon.

Looking at the opportunities generated by the Games and related projects, it seems that inner city businesses are well poised to take advantage of many of the opportunities. In Ference Weicker's analysis, a profile of the employment base in the inner city includes the following:

Retailers (including food service) account for about 27% of the number of employers and 21% of the employment in the region. Other leading sectors include manufacturers (accounting for 15% of employment) and wholesalers (13%). The region has a long history as a centre for apparel and food manufacturing and wholesaling. It is also benefiting from an emerging cluster in education. Opportunities for development have been identified in the areas of:

- Retail
- Tourism
- Education
- Apparel
- Food Processing and Wholesale
- Film, Arts, and Culture
- High Technology
- Light Manufacturing, Wholesale and Logistics
- Business Services

It is readily apparent how many of these industries may be poised to take advantage of coming opportunities, in both the base demand projections, and those that flow from the Games and related projects.

Concerns about barriers to work

There is a concern that contracting for the Games and related projects will favour organized labour with tight controls as to eligibility to work. In addition to lacking education and facing other barriers to employment, a great many inner city people lack the union connections which may be needed to get certain jobs.

Taking advantaged of indirect and induced impact

In our discussions with key informants concerning the Downtown Eastside, there was some emphasis on the more nuts-and-bolts reality of businesses that are operating there now, and the desire for opportunities to be made available to local enterprises, such as apparel and light manufacturing, which are established and ready to take on increased business. Community relationships and geographic proximity are reasons that the community development workers see more business for these employers as likely to benefit unemployed people in the Downtown Eastside.

Ference Weicker's *Community Assessment* report also cites a competitive advantage of inner-city businesses being locally sited, and able to take advantage of spin-off business opportunities; another advantage of being local is the potential to become aware of the opportunities. Speaking specifically of the Games, Ference Weicker says "The challenge will be to create awareness of the opportunities presented by the Winter Games amongst local businesses in the inner-city neighbourhoods and put mechanisms in place that would assist them in participating in these opportunities," and goes on to list some ideas for creating such awareness.

Some other recommendations from Ference Weicker's *Community Assessment* report:

- create awareness of the training and employment opportunities
- education and training to prepare for coming opportunities
- Ensure that Games' volunteer and staff training develops skills transferable to paid employment
- Program and services to assist in finding other employment after the Games period

7.1 Recommendations

Below are our recommendations regarding Vancouver's inner-city Neighbourhoods—Supply and Demand.

7.1 Use the demand information that we have presented in Chapters 3 through 5, applying it to develop a continuum of programs and policies to facilitate preparing the unemployed (including the long-term unemployed) to be able to access employment opportunities.

7.2 Build upon the Ference Weicker recommendation for work following this study: "Prepare an employment strategy for residents of the inner-city neighbourhoods," including a more detailed look at the employability characteristics of the neighbourhoods' populations, either as a group or individually, in light of the detailed analysis of demand/supply.

Chapter 8 2010 Volunteers

Besides the demand for paid labour, which we considered in Chapters 3-5, a very large impact on a population that hosts an Olympic Games is the volunteering effort. Thousands of people agree to work towards the goals of the Olympics, giving time and effort that matches those devoted to a paid job. This work is concentrated in the period of the Games, but volunteers are active years and months before the Games begin, and for a time after they have ended. In past Olympic host cities and areas, the experience has been as interesting and formative as a job, and has left a lasting legacy. In this Chapter we will consider some of the impacts of the demand for Olympic volunteers.

The intrinsic rewards of volunteering for the Olympics are great, and many people offer to volunteer just for enjoyment and satisfaction. Another benefit of the work, however, is gaining experience that can be career-related. Both from an individual point-of-view and from that of economic planners, the career-related benefits are significant – all the more so when multiplied by the thousands who perform volunteer activities. For that reason we are considering Olympic Volunteers as another category of labour demand for the 2010 Games.

8.1 Other events: The Number of Volunteers

We have researched the numbers of volunteers required at past Winter Olympics Games (some background may be seen in Appendix F). The best figures we have are for the Salt Lake City Winter Games, yet there are discrepancies between the precisely tabulated figures in the *Transfer of Knowledge* CD's for Salt Lake City (see Table 31 ahead) and the figures given throughout the Salt Lake 2002 *Official Report of the XIX Olympic Winter Games*.

8.2 Estimated Demand

For the Vancouver/Whistler 2010 Winter Games, an early estimate of the number of volunteers needed was 14,000.[37]

The actual number will be much greater. There is a history through recent Winter Games of volunteer numbers increasing. The population of the Lower Mainland is roughly that of the area surrounding Salt Lake City, whose Games by one estimate was able to deploy 30,500 volunteers. We estimated a minimum count for Vancouver-Whistler of 25,000–30,000 volunteers. Nagano and Salt Lake City experiences might suggest a number at the higher end, but there are as-yet-undecided factors (e.g. ceremonies performers, turnover, numbers of security volunteers).

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[37] from the Whistler site http://www.whistlertoday.com/cbc-news1.html

On March 11, 2003 we learned that the Vancouver 2010 Bid Corporation has already made an estimate of volunteer demand, and is going ahead with planning on that basis. The Corporation's estimate is 21,500 volunteers, roughly 17,800 for the Olympic Games and 3,700 for the Paralympics, with overlap difficult to predict. The belief is that the Winter Olympics at Salt Lake City over-recruited, resulting in volunteers at loose ends. The projected number of paid workers is 1,252 longer-term and 3,227 term under 6 months.

Differentiating "Sport Volunteers" from Volunteers for other functions at Olympic Games

A particular category of volunteers, the "Sport Volunteers", (specialists in the various winter sports assisting at venues, etc.) may be subtracted from the overall volunteer totals if we are to focus on career-related experience for the general labour supply. We have considered "sport volunteers" as a separate category, but undoubtedly expertise and networking in sports activities will be job-related and will lead to careers for a great many people. (See further notes in Appendix F.) For purposes of this study of labour demand, we will focus on the "employment"-related functions rather than the "sport" functions.

Table 31 contains the "headcount" numbers of volunteers, paid and contractor staff, and in some cases participants. Figures come from the Transfer of Knowledge material provided by Salt Lake City officials. The Sport Volunteers and a few other specialized functions have been removed.

Table 31 Salt Lake City Selected functions (Sport volunteers and other specialized functions removed)

	OLYMPIC GAMES				PARALYMPIC GAMES			
Function:	Volun-teer	Paid	Contr-actor	Parti-cipant	Volun-teer	Paid	Contr-actor	Partic-ipant
Accommodations	20	26	73	-	-	6	-	-
Accreditation	463	34	-	-	167	7	-	-
Arts & Culture	49	7	30	-	30	7	15	-
Brand Protection	35	6	-	-	6	6	-	-
Ceremonies	1,575	220	625	9,985	404	41	204	1,407
Education	16	7	-	-	5	6	-	-
Environment	11	8	-	-	5	6	-	-
Event Communications	222	30	-	-	32	9	-	-
Event Management	40	62	-	-	16	23	-	-
Event Services	4,352	1,857	126	-	403	304	56	-
Federal Government Relations	7	8	-	-	1	4	-	-
Finance	37	71	-	-	-	54	-	-
Food Services	467	29	5,058	-	116	13	1,778	-
Human Resources	435	110	-	-	153	74	-	-
Information Services	632	256	522		74	93	83	-
International Client Services	928	39	40	28	184	23	1	17

	OLYMPIC GAMES				PARALYMPIC GAMES			
Function:	Volun-teer	Paid	Contr-actor	Parti-cipant	Volun-teer	Paid	Contr-actor	Partic-ipant
Legal	2	17	-	-	-	19	-	-
Marketing	85	37	-	-	-	27	-	-
Media Relations	13	15	-	-	-	11	5	-
Medical Services	1,329	57	253	30	319	35	43	27
NOC/NPC & Athlete Services	787	21	-	-	282	18	-	-
Office Management	6	28	-	-	4	11	-	-
Olympic/Paralympic Village	372	124	364	-	251	121	364	-
Paralympics	2	9	-	-	18	9	-	-
Press Operations	607	135	-	-	95	31	-	-
Risk Management	32	24	14	-	3	16	14	-
Senior Management	5	40	-	-	5	27	-	-
Sponsor Services	71	15	-	-	-	7	-	-
Sport	13	13	-	-	11	14	-	-
Sport Entries	14	2	-	-	8	2	-	-
Telecommunications	433	124	377	-	44	96	33	-
Ticketing	16	12	131	-	-	18	25	-
Transportation	3,066	1,478	1,711	-	699	224	523	-
Venue Development	35	102	489	-	5	34	96	-
Weather	27	10	-	-	15	7	-	-
WRCS Hosts	14	-	-	-	-	-	-	-
Total Headcount	**16,218**	**5,033**	**9,813**	**10,043**	**3,355**	**1,403**	**3,240**	**1,451**

Source: Headcounts by Function, from Salt Lake City Transfer of knowledge CD no. 3.

Variations in Skill levels of Volunteers

We should not make any hasty judgments about the levels of skill, training, and experience to be found in a volunteer workforce. Large events like the Olympic Games have a track record of attracting volunteers at the highest level of competence. An example that was brought up repeatedly during our interviews was the volunteer work by business leader, Jim Pattison as head of the Expo Corporation for Vancouver's Expo 86. For Calgary's 1988 Winter Games, the 490 paid staff did not begin to encompass all the leaders and managers; a large component of Team 88's leadership cadre was volunteers. In other previous Olympics, too, organizers, auditors, "chairs" of key groups and other managerial functions have been staffed by volunteers.

A look at the tables for volunteer functions (above) will show very large medical services groups for large Games and similar events. These have included physicians, dentists and medical personnel, often in quite large numbers. Nurses and paramedics, as well as qualified physiotherapy and massage therapy volunteers, are to be found at most major sport gatherings.

Other kinds of skilled work and some nearly "unskilled" jobs are also carried out by volunteers. Some categories of workers that are needed in larger numbers are:

- Workers in transportation: driving, coordinating, dispatching, directing traffic
- food service workers
- clerical and administrative workers
- assistants in medical services
- hosts, guides and information providers
- educators and public speakers
- people skilled in communicating, coordinating, organizing project planning and control, and similar middle-management functions

8.3 Numbers of Volunteers in Job-Related Work

Taking the conservative estimate for the Olympics of 21,500 volunteers, if we remove sport volunteers — as many as 4,000 (assuming fewer than in Salt Lake City) – that still leaves 17,500 volunteer positions. Setting aside medical professionals and paramedics (maximum of 2,000 looking at Salt Lake City– various sources, Calgary 1988 and the Pan American Games totals), that leaves 15,500 volunteer positions of a non-medical nature – which is a very conservative estimate.

There is no doubt that sufficient numbers of volunteers will come forward. This has been the experience at all recent games, and the Vancouver 2010 Bid Corporation has indications of the same response here, with 100,000 people already having registered their interest in volunteering. (See also research material on volunteering patterns in Canada and BC –Appendix F)

The issues that require attention are matching of skills with volunteer positions, and recognition of the volunteer jobs as a valuable resource to be allocated amongst the communities in the local area.

8.4 Skill and Career Development Opportunities in Volunteering

Analysts give explicit recognition to the social and economic value of the experience and training gained through volunteering at Games and similar events. In *Let the Spirit Live On*[38], the chair of Calgary's Volunteer Development Committee describes the "legacy" of the training program and skills developed during involvement with the games, a legacy "that enhances the community". In the 7 months before the games, 8,000 volunteers went through general training covering topics such as the Olympic Movement and Committee goals[39]. Closer to the games, 3000 benefited from specific training sessions in such areas as:

- supervisory and management training
- advanced phone and reception techniques

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[38] On page 117.

[39] *The Official Commemorative book : XV Olympic Winter Games*, by Lloyd Robertson and Brian Johnson

- SuperHost program
- specific technical training, such as radio, radio protocol, defensive driving…,
- cross-cultural interaction
- CPR, First Aid
- public speaking, and
- protocol.

"Training the army of volunteers one of the organizing committee's most important tasks."[40]

Another worthwhile report that was found too late to include in this document is the Australian report *Strategic Training Issues and Recommendations for the 2006 Commonwealth Games*,[41] by Tourism Training Victoria and Arts and Recreation Training Victoria. It appears to have valuable suggestions on aspects of volunteering, training and employment, and lessons learned from other events.

The Official Commemorative book: XV Olympic Winter Games, by Lloyd Robertson and Brian Johnson, describes how some of the Calgary organizing was accomplished. That included creation of a Volunteer Division which:

- developed programs of volunteer education
- established volunteer assessment and recognition methods
- formed the committee structure (more than 75 in all)
- identified volunteers' interests, skills, experience and matched them with needed services.

Volunteers filled some of the Games' most important roles – including chairs. The system for organizing 20,000 unsolicited applications and the response to them is described, as well as the Volunteer Assessment and Recognition Committee, with some of its initiatives:

- developed volunteer programs in two stages:
  - many prior to the games
  - one at the conclusion
- frequent requests for feedback (volunteers as well as staff)
- recognition and rewards events

Also the testing of organizational systems ahead of time (during "Preview 88", a series of international sport competitions) included a full testing of volunteer functions. Calgary constructed a central workplace for volunteers: Olympic Volunteer Centre

- Upper floor large meetings, major orientation and training programs
- Lower floor; smaller meeting rooms and individual workspaces.

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[40] [according to Robertson/Johnson]

[41] *Report: Strategic Training Issues and Recommendations for the 2006 Commonwealth Games* (Melbourne: Tourism Training Victoria and Arts and Recreation Training Victoria, May 2002).

It is described as "one of the organization's masterstrokes before the Games".[42]

A post-event study on the impact on business of the Sydney Games (*Sydney 2000* – State Chamber of Commerce) refers to general agreement that the volunteer experience gave companies a legacy of a better trained workforce. For those games, the training was designed to give volunteers accreditation toward other "tertiary education courses". The training was designed to OCOG[43] requirements and delivered by Australia's "Tertiary" colleges.

The same study says that volunteers "set the benchmark" in Sydney for customer service; some industry sectors and businesses "have sought volunteers for paid positions or in advisory roles." There is wide recognition that exposure and contacts made during volunteering can generate leads for paid employment later.[44]

8.5 Networking Opportunities

The working relationships are close and intense on committees and workgroups, and, because they are well organized to achieve the OCOG's objectives, they resemble corporate workgroups. In such circumstances, the working relationships are a very valuable thing for volunteers who are seeking paid work outside the Games. The distinction between paid and unpaid workers is deliberately blurred in some Olympic workforces (notably Calgary's); volunteer workers are recognized for their skills and contributions. In short, the contacts made by volunteer staff—whether with leaders or with each other—a:e excellent for jobseekers.

In a BC study done by RKA on barriers to employment faced by long-term recipients of social assistance and employment insurance[45], a major barrier cited by most respondents was "It's Who You Know". They recognized that contacts – a social network – form a very valuable resource for jobseekers. Similarly, the need for access was cited by key informants in this study. Spokespeople for low-income groups emphasized that they need to be "at the table" when decisions are made to allocate jobs or business, and that their clients need information on opportunities as a starting point. Volunteering opportunities were specifically mentioned.

All indicators point to the potency of this legacy, and the opportunity should not be lost to plan strategically for its influence in the labour market, with full awareness of the long-term benefits it can bring to the province. With that in mind, it would be useful to review various approaches, and some innovations, that have been seen in other Games and similar events. We have included a summary of strategies and best practices from other Games in Appendix F.

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[42] Robertson/Johnson

[43] Organizing Committee of the Olympic Games

[44] *Sydney 2000* – State Chamber of Commerce, 2000, p. 27.

[45] *Client Barriers Faced by the Unemployed in the HRDC Okanagan Service Area*, 1999

8.6 Recommendations

Below are our recommendations regarding Volunteers.

8.1 Recognize the crucial strategic importance of volunteers, and recognize volunteer jobs as a valuable resource to be allocated amongst communities, much in the way the paid jobs are.

8.2 Learn from some key strategies from other Games:

- the strategy of mixing volunteers at all levels with highly qualified leaders.
- the strategy of minimizing the distinction between paid and unpaid staff, with a view to maximizing responsibility and accountability of volunteers (but keeping in mind the need to observe the distinction that is important to unions in certain sectors).

8.3 Ensure proper leadership, instruction, support and recognition for volunteers.

8.4 Use the Salt Lake City Transfer of Knowledge CD's (available in Bid Corporation library) when detailed information is needed on staffing, jobs, work descriptions. (This source is the most complete, detailed, and compact of any on Olympic Winter Games Human Resources.)

Chapter 9 Labour Supply

The main object of the present study is to examine the impacts of the 2010 Winter Games and related projects on the demand for labour. However, considering demand without looking at supply has been compared to trying to cut with a pair of scissors that has only one blade. Therefore, in this Chapter, we will take a preliminary look at some labour supply issues. A detailed quantitative analysis of labour supply should be undertaken as soon as time and resources are available.

We have seen the base growth in labour demand (without the major projects, Chapter 3); we have reviewed the incremental effects of each of the major projects (Chapter 4) and the total incremental impact including all the projects: the Games, the VCEC, the Sea-to-Sky Upgrade, and the RAV (Chapter 5). We also looked at the particular impact on the labour market of the large volunteer contribution to the 2010 Games (Chapter 8), and we paid particular notice to some supply and demand issues affecting groups important to the Bid and to the Games (Chapters 6 and 7). In this Chapter we turn our attention to the overall labour supply which will be available to meet the demand we have outlined.

Since this study is chiefly about the demand aspects of the major projects, our research and the majority of our analysis have focused on demand, with as much precision and comprehensiveness as available data has allowed us. We must emphasize that our comments on supply are more general in nature than the analyses of demand in Chapters 3, 4 and 5. Subsequent study of the labour supply issues, in further projects and phases, will be sponsored by the Human Resources Planning Committee, towards the objective of an overall strategic plan and component strategies.

In general terms, the supply options for meeting the labour demand are:

- Drawing on an existing labour force, including unemployed people, people willing to move into new jobs, new entrants to the labour force with appropriate skills, qualified people out of the labour force who choose to return to work (perhaps because of the major projects), etc.
- Drawing on existing workers, but via lateral moves (upgrading skills or re-training workers for new skills to work in new areas)
- Training people (this can include formal or institutional training, and also learning that takes place in the job situation, either formal or the informal learning of new skills by entry-level workers)
- Recognizing credentials (applies to work for which formal credentials are required but recognition is lacking for some groups, e.g. workers with foreign credentials or experience)
- Drawing upon migration, either from the rest of Canada, or foreign workers from other countries, recruited to fill particular positions.

These are the main sources of supply to meet labour demand. They are also potential sources that we asked our key informants to comment on when we interviewed them concerning the impact of the Games and related projects.

The provincial government has been doing some important work in addressing supply issues in BC with a view to developing a human resources strategy for the province that would support economic growth. A fundamental part of achieving that outcome was to provide an opportunity for the business/employer community – given their responsibility for recruitment and retention of labour – to help define the nature of the skills shortage problem within British Columbia. The Ministry of Skills Development and Labour's *Summary Report* on a series of Skill Shortage meetings with representatives of businesses in key industry sectors was released in January 2003. It can be found at: http://www.labour.gov.bc.ca/skills/final-report-jan2003.pdf

Key sectors of interest to our analysis that were addressed during that study were:

- Construction
- Technology
- Tourism
- Transportation
- Small Business

(Also interviewed were representatives of Oil and Gas, Mining, and Forestry sectors.)

Interview results from each of the key sectors are summarized in the paper, and employers' anticipations of shortages are well worth considering. We will also excerpt here Key Outcomes from the Ministry's Report (see following page):

Key Outcomes: Ministry of Skills Development and Labour's

Skill Shortage Meetings

The objective was to determine the nature and extent of possible shortages in their business/sector, and to solicit their views as to the role of government in addressing this issue.

Key outcomes include:

- While several specific occupations were identified as currently being in short supply and/or difficult to recruit, current skills shortages were not generally identified as a critical area of concern.

- Significant concern was expressed across most sectors with respect to looming skills shortages particularly in light of the demographics of British Columbia's population.

- The redesign of the industrial apprenticeship training system must be resolved in a timely manner.

- An apparent disconnect exists between many educators and businesses with respect to the nature of skills required in today's workplace and the range of career options available to youth. [The "disconnect" refers to decisions about skills needed by businesses as opposed to what training institutions deliver.]

- Leadership and managerial/supervisory skill shortages were identified as a critical issue within firms and in terms of developing community-level connections across sectors and between business and education.

- The role of the private sector in developing and providing education for their employees (in areas such as trades and technical occupations) should be encouraged and supported through mechanisms such as, but not limited to, education [training] tax credits.

- The key role of government should be the establishment of an economic climate that encourages investment through sound fiscal and regulatory regimes. Government also has an important leadership role in facilitating the coming together of various parties to address the skill shortages challenges.

- Ongoing forums for dialogue with individual employers concerning key issues such as skills shortages should be encouraged and continued.

The paper also contains recommendations from each sector group for actions to improve the human resources strategy and address shortages where indicated.

Both our demand analysis and our interviews with key informants point to a variety of issues concerning supply that complement the above findings.

9.1 Apprenticeship Issues

There needs to be a framework for apprenticeship programs that will attract and retain to completion sufficient numbers of workers to meet current and future growth as well as replace workers who retire or leave a trade. Greater flexibility and modularization may help. One key informant spoke of the need for innovative approaches, such as employing older, skilled workers as mentor/trainers, even past retirement age.

9.2 High School Completion

Lack of secondary education makes one functionally illiterate in the 21st century. However, many young people who drop out of high school drop into adult education and get their high school or equivalent within a few years. Options to do this need to be available and known.

9.3 Recruitment and Retention

Even in the base scenario, there is a rising number of occupations in specific industries which are projected to have difficulties with supply. Analysts have realized that some of these occupations, at different skill levels, are related so as to present an opportunity. For example, some entry level occupations in retail, food service and other tourism-related industries experience high turnover and a labour force threatened by demographic change, while there is a growing need for managers of the same groups. The strategy that industry analysts have devised is to address issues in the occupations such as compensation, conditions of work, etc., but also the "image" of the occupations, particularly a perceived lack of career path. If the connection is made between the entry level work and the (real) opportunities to advance to supervision and management, it is hoped that a stronger and more continuous attachment to the industry will evolve.

In skilled trades of construction and manufacturing, some similar challenges exist. Potential recruits may not tend to imagine themselves in the trade for a variety of reasons. Industries are considering "awareness" promotion. Similarly, skilled workers may not readily see themselves as having supervisory or management potential, or may lack the most basic skills to take the step into those areas, even though the shortage is already being noticed.

A part of the challenge is to get candidates thinking in terms of the work and the career path, where traditionally they have not done so. Young people need to be aware of the chance for a career; they need to consider the formerly-unthought-of field as holding potential comparable to opportunities that flow from post-secondary education. And non-traditional recruits of different ages, perhaps with pre-existing life experience or occupational experience, need to be considered as potential candidates. Industry analysts also describe a growing awareness of the value of accommodating individual needs (e.g. flexibility in scheduling work) to make some recruitment and retention gains.

In the human resource considerations related to the Olympic Bid and related projects, two groups receive some more attention. We have discussed First Nations (Chapter 6) and the inner city neighbourhood (Chapter 7), making some recommendations on supply issues particular to those groups. Please see the relevant parts of those Chapters.

9.4 A Coming Change in the Labour Market

For a generation or two, the BC labour market has been dealing with a surplus of labour supply, or at least a background threat of such a surplus. However a theme that emerges from the Ministry of Skills Development and Labour's work (above) and our own key informant interviews is that the time of labour surplus in BC is slipping away. The future definitely holds no surplus. We are possibly facing a tighter labour market than anticipated with the higher retirement level (brought on by demographics) as we reach 2010—exacerbated if other major projects are occurring here or even outside BC. So the coming labour market may encounter pressures of two distinct kinds:

1. Lack of highly skilled or educated workers (shortages of this kind have existed a long time; we are used to hearing about them even in the surplus labour market)

2. Demographics (the disappearance of skilled workers, and barriers to recruiting workers to take their place, as demand grows – an entirely new cause of shortage)

We think it is very important to take a hard look at the numbers that appear in the labour demand analysis – even in the "base growth" of Chapter 3. The need for planning, preparation and coordination is very high, for the province to meet the challenge of supplying labour demand in the coming years. Adding the Games and related projects to the mix, while it brings tremendous economic opportunity to the province, also increases the challenge of meeting demand.

9.5 Issues of Migration of Workers

Many key informants have said that once major projects are started or announced, it will trigger an influx of needed workers to BC.

> "One area of concern ... was that there have been virtually no major capital projects (in excess of $500 million) in BC since Expo 86. Because of the mobility of the construction workforce, labour has gone to where the work can be found. ... [I]f BC has major capital projects, it is anticipated that the labour pool will return."
>
> —Ministry of Skills Development and Labour's Skill Shortage Meetings, Construction Sector, p. 11.

Any discussion of migration of workers prompts that thought, but there is not a more systematic discussion of ways of formally approaching workers in other areas of the country for targeted recruitment. Consideration should be given to strategies for identifying supplies of workers for high-demand occupations, or workers with related skills, in other parts of Canada. Unfortunately, time did not permit the development of such strategies as part of the present project.

Consideration needs to be given to the possibility of major projects in other parts of Canada and elsewhere between now and 2010. Such projects will be competing with the BC projects for labour. A watching brief should be kept for such projects as they will not only make it more difficult for BC to attract workers from outside the province, but could even draw BC workers away.

Key informants suggested to us that that a "BC first" approach to recruitment made the most sense in any human resources strategy applying to the Games and related projects. There was even stronger agreement that every means should be taken to recruit within Canada before turning to foreign workers to meet demand. The federal government's policies of foreign worker recruitment are to ensure that only urgently-needed skills, unavailable by any other means within the country, are cause to import foreign workers. Key informants told us of the rare circumstances in which they may need to turn to foreign worker recruitment to fill particular positions (often critical ones, where technical or time dependencies mean that the foreign recruitment expedites employment for Canadian workers).

The foreign worker policy is separate from the ongoing Immigration program, and one source of supply that should not be overlooked is the pool of immigrants who are already resident in Canada, in many cases doing work different from their former occupation. Facing a situation of no more surpluses (and potentially some serious shortages) we should take every measure to protect the BC economy from loss of productivity. Analysis should be undertaken to identify the number of experienced and/or skilled workers who are not able to use their skills, and the best means of rectifying that situation, e.g. by credential recognition, internship or upgrading measures, etc.

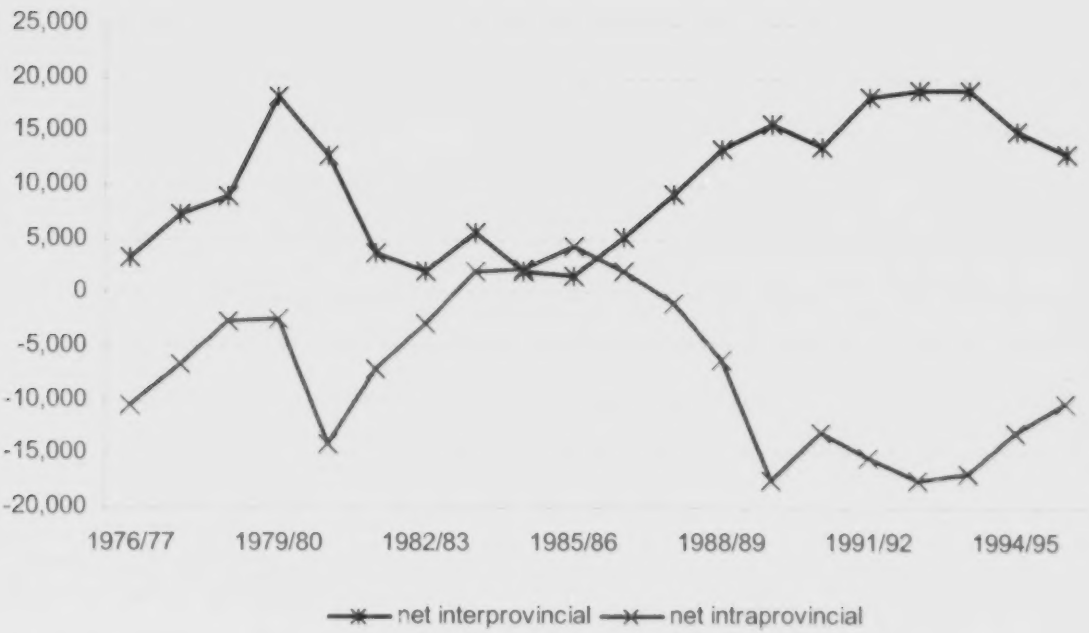
9.6 Intra-Provincial and Inter-provincial migration

The potential increase in labour demand due to the Games and other related projects presents a challenge to the province's labour supply If all projects go ahead, the use of out-of-province labour could reduce the pressures tending to drive up the cost of labour, which could in turn mitigate employment and other economic impacts realized within the province as some of the wages of out-of-province workers earn will be spent in their home provinces. On the other hand, if there are increases in net in-migration to the region concerned, the labour demand-supply gap could be narrowed and the potential employment and other economic impacts could be retained within the province.

In this section, we examine the interprovincial and intraprovincial migration pattern in the Greater Vancouver Regional District during the years of the Expo 86 event, so that we can gain some understanding of whether a similar situation might arise during the Games.

Figure 26

Interprovincial and Intraprovincial Net Migration in GVRD 1976/77 to 1995/96



Source: BC Stats

Figure 26 shows net interprovincial and net intraprovincial migration for the Greater Vancouver Regional District for the period 1976/77 to 1995/96.

It is clear from this graph that there was an influx of intra-provincial migration between 1983/84 and 1986/87. In all other years net intraprovincial migration was negative for the Greater Vancouver Regional District, indicating that there were more people moving out of this geographic area to other parts of the province than those moving in.

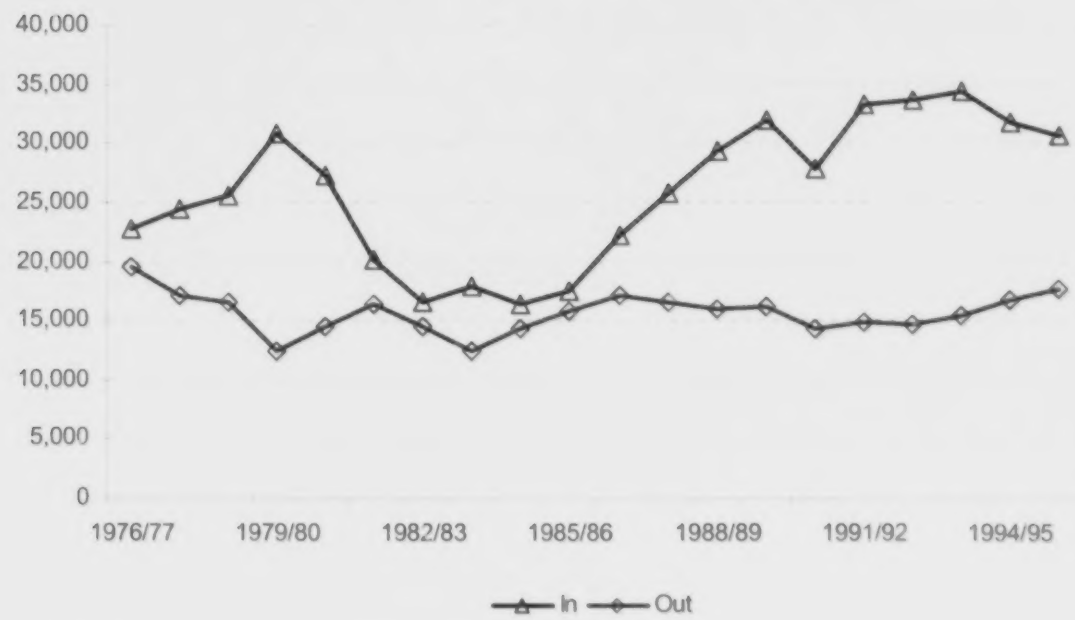
However, we also recognize that there were other factors affecting intraprovincial migration to the Greater Vancouver Regional District at that time. The recession in 1982 in BC had hit many resource-based communities hard and had contributed to migration of population from these communities into the two

metropolitan centres of Vancouver and Victoria where the economic base was broader and tended to be more stable. As such we can conclude that the Expo 86 events had a limited but positive impact in drawing labour into the area.

Net interprovincial migration's pattern appears at first glance to tell a different story. Net migration was in the range of approximately 2,000 in 1982/1983 to approximately 5,000 in 1986/87, substantially lower than other years during this period of analysis (except 1976/1977). However, a closer look at the individual interprovincial in-migration and out-migration levels reveals that while interprovincial in-migration was at the lowest between 1982/83 and 1985/86, interprovincial out-migration was also at the lowest level during the same years. The conclusion that can be drawn here would be that during those years leading to the Expo 86 event, the regional district's economy was not favourable enough to attract people from out of the province. However, Expo-related activities may have contributed to retaining people who otherwise might have left the regional district for another province.

Figure 27

Interprovincial In-Migration and Out-Migration in GVRD, 1976/77 to 1995/96



Source: BC Stats

As such we conclude that the incremental employment demand during the Expo 86 event would have been most likely met by intraprovincial migration as opposed to a large influx of migration from outside of BC.

Many of the key informants we spoke to foresaw significant migration of labour, drawn by the large projects. Government spokespeople and the construction sector were in agreement that construction trades migrate towards large projects in this way, and the indication was that returning residents of BC would be a large proportion of the in-migration, particularly those who had left to follow other large projects. Similarly, respondents in the retail and tourism areas thought that the large events (especially the Games) would be a draw to workers in their industries. A transportation sector respondent described the use of vehicles from intraprovincial and interprovincial sources, which in turn would be accompanied by labour to operate and service them. And respondents in the technology sector emphasized the events (particularly the Games and VCEC) as draws to investment, and to highly-skilled workers to take up residence in BC. The latter were not seen as drawn directly (i.e. to project or project-induced work) but by the profile and promotion the events would give to BC and the Lower Mainland as good places to work and live.

9.7 Need for In-Depth Labour Supply Analysis

Subsequent to this project, it is recommended that the Committee conduct a comprehensive labour supply analysis, to identify the available supply for the occupations showing the highest incremental labour demand. In addition, key occupations which show high average annual growth rates should be examined (even if actual numbers are small).

Some suggested main steps in conducting a supply analysis are as follows:

- A review and confirmation of the occupations to be investigated, and the skill requirements they entail, followed by
- A series of interviews with key informants comprising

  Employers (managers and supervisors)

  Employer associations

  Worker associations

  Unions

  Professional associations where appropriate.

These interviews would focus on confirming assumptions about characteristics of the occupations and skills, and of the labour supply to be investigated. The key informants would also be canvassed on human resource plans, studies and other initiatives, which would be the basis for a literature review. Armed with this expert

information, the investigators could then conduct a detailed statistical analysis of the available and future supply by using data sources such as Census data and Labour Force Survey information, looking at factors such as:

- Occupation
- Industry of employment
- Age
- Education
- Labour Force Activity
- Income
- Mobility.

This detailed analysis would enable identification of:

- numbers of people in occupations at the 3-digit level, and where appropriate, finer levels,
- trends in aging, etc. that could affect labour force status.

Other indicators of supply for review include:

- training and graduate outcomes information, and
- A literature review of
    - Ministry of Skills Development and Labour's Skill Shortages Consultation and Analysis, and
    - other existing current studies of base growth for various industries, such as The Tourism Sector in British Columbia: Literature Review, Labour Market Projections and Training Gap Analysis by CS/RESORS Consulting, Ltd. and HR Demand Analysis for the BC Aerospace Sector – Aerospace Industry Association of BC (by Ruth Emery).
- An assessment of populations as potential sources of supply such as
    - students,
    - youth,
    - surplus workers from other occupational groupings that are in oversupply,
    - target groups, and
    - known groups with large unemployment numbers. Analyses should be made of characteristics of these groups in terms of education, skills, and their aspirations to the degree that they can be determined, and known barriers to employment or to training.

Special attention should be given to equity groups as sources of supply. The Ference Weicker report "Phase II of the Economic Capacity Study" presents good analysis. It should be reviewed, and consideration should be given to an attempt for more detail on education, experience, skills, etc. for the Downtown Eastside. Groups and expert sources on other equity groups should be consulted, e.g. SUCCESS.

In addition, some analysis should be done of alternate models for supplying labour. For example, the Ference Weicker report describes "social enterprise" models (p. 105). Another alternate approach was described by key informants who described the model of identifying a supply of workers, training them, and then hiring them as not always optimal. Some very good experiences amongst First Nations have included contracting work out to independent operators or local communities.

The highest incremental demand occupations in this study have been limited to those with the higher numbers. There may however be some value in considering occupations with lower numbers where they may hold promise for surplus workers with related skills, or if aggregating groups of occupations may be relevant for some supply populations because of skill level, education level, etc. This possibility should be considered.

The outcome of an analysis of numbers (supply against demand) would be recommendations for meeting demand, for preparing groups (such as youth, marginalized labour force participants like Aboriginal people, persons with disabilities, long-term unemployed, etc.) to fill the demand via training, apprenticeship, etc., other measures (such as importation of workers), and indications of the risks and impacts if demand cannot be met.

In respect of risks and impacts, the whole question of human resource planning, which has been mentioned frequently by key informants during this study, should be considered – with indications of which occupations/industries face important gaps or shortages, and measures that may be in place or are planned to address the problems. Recommendations would then be made to facilitate or leverage collaboration amongst industries, worker groups, levels of government, etc to begin necessary human resource planning as early as possible.

9.8 Recommendations

Below are our recommendations regarding Labour Supply.

9.1 Conduct a comprehensive labour supply analysis, to identify the available supply for the occupations showing the highest incremental labour demand, but also for the "base growth" of Chapter 3. In addition, examine key occupations which show high average annual growth rates (even if actual numbers are small). A more detailed description of the work is given in Chapter 9 Labour Supply.

9.2 Put in place a framework for apprenticeship programs that will attract and retain to completion sufficient numbers of workers to meet current and future growth as well as replace workers who retire or leave a trade.

9.3 Use the opportunity of the Olympics and related projects to promote skilled trades as a career and attract people into the skilled trades — actions for both government and industry. (Construction, other sectors). — From Key Informants, Multiple Sources

9.4 Ensure that maximum efforts are made to "share the wealth"/promote opportunities for areas outside the Lower Mainland. — From Key Informants, Government and Organizations

9.5 Keep a watching brief for major projects in other parts of Canada and elsewhere between now and 2010, which will compete with the BC projects for labour, not only making it more difficult for BC to attract workers from outside the province, but possibly drawing BC workers away.

Chapter 10 Potential Demand-Supply Gaps

From questions of supply in the last Chapter, the next stage of the Human Resource Planning Committee's progress towards completion of an overall strategic plan is the identification of gaps and imbalances. That is the topic of this Chapter. Given that our focus and research has been on labour demand and that labour market gaps are defined as the difference between supply and demand, our discussion here is limited by the lack of a detailed analysis of supply. It will necessarily be cursory, and at a high level of generalization.

In general terms, gaps or imbalances in demand-supply, when they occur, are identifiable through answers to questions such as the following:

- Is there sufficient capacity in the labour force, in terms of absolute numbers, i.e. numbers of workers, or sufficient hours of work available to meet aggregate demand for the work to be performed?
- Do the people in the labour force have the skills necessary to perform the work at the level required? If there is a gap in terms of skills, then does the capacity exist to develop the skills and provide the training, i.e. sufficient time, and the wherewithal to provide the training?
- Are the workers with the right skills in the right place, or is mobility for workers necessary (which leads to issues of how to bring about the mobility)?
- Are the other necessary factors all in place, such as sufficient people of working age, job-specific skills, credentials and formal qualifications, requisite experience, and so on?

Subsequent stages in the Committee's work will focus directly on the supply side, labour market gaps and imbalances, giving a more robust analysis which can lead to strategies to address them, along with other strategies to maximize employment and skill development opportunities in a long term Human Resources Plan.

As we review the major areas of demand identified in Chapters 3 through 5, some areas of very large demand begin to appear, suggesting a potential for gaps.

Table 32 shows the occupations from Chapter 5 Total Labour Demand, with skill levels for the occupational groupings. Skill levels are defined in the National Occupational Classification as:

- A—Occupations usually requiring university education
- B—Occupations usually requiring college education or apprenticeship training
- C—Occupations usually requiring secondary school and/or occupation-specific training

- D—On-the-job training is usually provided for occupations (i.e. unskilled entry jobs)

Table 32 Total Labour Demand in BC from 2003 to 2015 by Occupation (High Estimate) with Skill Levels

	Total Incremental Employment Growth	Total Openings in Base Model	Total Labour Demand	Skill Level
0 Management Occupations	15,140	95,756	110,896	Varies A-B
11 Professional Occupations In Business And Finance	3,833	36,284	40,118	A
12 Skilled Administrative And Business Occupations	6,277	56,486	62,763	B
14 Clerical Occupations	8,494	66,423	74,917	C
21 Professional Occupations In Natural And Applied Sciences	4,524	45,046	49,570	A
22 Technical Occupations Related To Natural And Applied Sciences	3,369	25,012	28,381	B
31 Professional Occupations In Health	360	28,627	28,987	A
32 Technical And Skilled Occupations In Health	272	13,266	13,538	B
34 Assisting Occupations In Support Of Health Services	172	16,388	16,560	C
41 Professional Occupations In Social Science, Education, Government Services And Religion	2,285	58,101	60,386	A
42 Paraprofessional Occupations In Law, Social Services, Education And Religion	785	10,510	11,296	B
51 Professional Occupations In Art And Culture	2,458	11,942	14,400	A
52 Technical And Skilled Occupations In Art, Culture, Recreation And Sport	4,101	16,267	20,368	B
62 Skilled Sales And Service Occupations	13,056	67,039	80,095	B
64 Intermediate Sales And Service Occupations	16,175	91,993	108,168	C
66 Elemental Sales And Service Occupations	17,255	82,468	99,723	D
72-73 Trades And Skilled Transport And Equipment Operators	14,591	76,137	90,728	B
74 Intermediate Occupations In Transport, Equipment Operation, Installation And Maintenance	7,927	50,932	58,859	C
76 Trades Helpers, Construction Labourers And Related Occupations	1,644	4,370	6,014	D
82 Skilled Occupations In Primary Industry	1,107	13,362	14,469	B
84 Intermediate Occupations in Primary Industry	362	3,144	3,506	C
86 Labourers In Primary Industry	694	2,861	3,554	D
92 Processing, Manufacturing And Utilities Supervisors And Skilled Operators	789	6,548	7,338	B
94-95 Processing And Manufacturing Machine Operators And Assemblers	5,102	27,495	32,597	C
96 Labourers In Processing, Manufacturing And Utilities	1,027	6,828	7,855	D
Total	131,799	913,285	1,045,085	

Source: RKA

It can readily be seen that very few of the new openings will be for unskilled workers at entry level (total skill level D openings: 116,696 or 11 percent). The overwhelming majority of them are in 66 Elemental Sales and Service Occupations, which include:

- 661 Cashiers
- 662 Other Sales and Related Occupations (includes Service Station Attendants, Grocery Clerks and Store Shelf Stockers, Other Elemental Sales Occupations)
-

- 664 Food Counter Attendants, Kitchen Helpers and Related Occupations
- 665 Security Guards and Related Occupations
- 666 Cleaners
- and others including Operators and Attendants in Amusement, Recreation and Sport , Launderers

Many of these are the entry-level jobs in retail and tourism that those industries have told us about. The other occupations in Table 32 require higher skill levels and/or education.

In Chapter 9 on labour supply, we have seen some trends as well:

- Demographic change: the age of the labour force is increasing and there will be a lower percentage of working age people.
- Ongoing need for training, skill development.
- Growing emphasis on career path choice, awareness of opportunities.
- Effects of mobility and migration.
- Growing importance of recognizing credentials.

10.1 Shortages described in Ministry of Skills Development and Labour's sector interviews (2002-2003)

We have already discussed (on Page 94) the series of interviews done in 2002 by the BC Ministry of Skills Development and Labour. Briefly summarized below are shortages identified there:

Technology

Shortages in highly specialized professional/technical occupations such as

- Senior Software Engineer
- Computer Graphic Artist and Senior Optical Engineers.

There is also increasing difficulty in recruiting senior technology executives to BC.

Small Business

Some shortages now, but a looming skills shortage. Gaps between workplace expectations of new workers and actual compensation, work hours, scheduling and performance outcomes. There might not be skills shortages for $40 per hour occupations but there certainly are for $15 per hour occupations. Specific areas of current and/or projected shortages include

- roofers
- drywallers
- auto mechanics

- graphic artists
- entrepreneurs.

Tourism

Anticipates in the near future both skill gaps and skill shortages. Occupations of current and/or future concern include

- chefs/cooks
- room attendants
- sales/marketing
- managerial/supervisory and human resources.

Transportation

- millwright,
- electrician and
- heavy-duty mechanic
- experienced truck drivers in Greater Vancouver (on Vancouver Island this is less of a problem).

Construction

Uncertainty whether there really is a skills shortage or an allocation issue. It was generally agreed that there is a lack of reliable information within the sector to effectively project the impact of skill shortages. While there might be a shortage of plumbers, there is not a shortage of $40/hour plumbers.

- drywallers
- middle management
- human resources staff
- technicians in the service segment of the sector
- higher-skilled trades.

10.2 Supply: Key informants' views

During the interviews conducted with our key informants, it was notable that some of the Highest Incremental Labour Demand occupations received no mention. This was in part due to the targeting of very specific industries for the interviews.

945, 949 Machine Operators and Other Assembly (e.g. in garment and furniture manufacturing)

These occupations do not occur in any industry that we spoke to. On the other hand, comments from employment development workers in the Downtown

Eastside and inner city referred to the prevalence of the garment industry as well as printing and light manufacturing in that area. They are well aware of the demand for garment and other manufacturing when the Games and VCEC projects are underway, a fact also mentioned by the Olympics spokesman (large amounts of money to be let in contracts in the years just prior to the Games), and how labour-intensive rather than resources-intensive those contracts would largely be. The concern of the employment development respondents was that local area businesses get a fair shake at bidding on such contracts, to ensure that, if the local industry can bid successfully, the local population will have a chance at the jobs, rather than seeing the money flow offshore.

141 and 124, Clerical, Office, Secretarial, and 143, Finance and Insurance Clerks etc.

These groups received no mention – but that is no doubt because administrative and overhead functions are somewhat transparent to the key informants speaking of the particular characteristics of their industries. These same informants often warned of the synergistic effects of several projects (such as construction projects) going on at the same time, or the competition for similar labour pools (such as that between the retail and hospitality sectors) – but it may be easier to overlook the fact that all sectors use office, clerical and administrative workers, and that the various projects will stimulate demand for these workers at the same time. It is also possible that some of these workers will perform computer-related activities which were not highlighted by Technology sector respondents, who largely do not accept that the Games and related projects will create significant demand in their sector. While acknowledging that there will be significant IT activity created, they say it will be sourced out to service providers; it will not be "new" development, and as such is not properly "high-tech" activity.

Similarly, we did not hear mention of some more project-specific occupations during our brief survey of key informants. Nor was our interviewing instrument designed to go to the level of depth to reveal them—occupations such as:

146 Mail and Message Distribution (Olympic Games), 744 Other Installers/Repairers/Servicers (Sea-to-Sky Project) or 742 Heavy Equipment operators (VCEC).

Respondents in the construction sector mentioned the increase in demand for 761, Trades Helpers and labourers, but projected with some confidence that the industry will easily be able to absorb the extra work, and easily find the labour to meet this demand. The same was true of the industry's capacity to meet demands for more skilled labour, the increase being moderate given the flexibility of its labour market, the industry's large size, and factors such as the predictable interprovincial migration of construction labour to known large projects.

The construction industry respondents also singled out **carpenters** (framers and other specialty occupations) and **electricians (724, 727)** during interviews, as trades likely to encounter supply gaps when impacted by the Games and related projects. **725 Plumbers and pipefitters** also received some mentions, though less definitely. And the Construction industry respondents remained confident in the capacity of the industry to handle the demand. Their larger concern was the base growth in demand for the skilled trades (especially those above) and how the industry will adjust to the aging trades workforce and the lack of entries into the trades by young people at the present. They definitely predicted higher wages across the industry as one of the methods by which the industry will adjust to increased demand. **728 (drywallers** especially) are in perennial shortage; it is an occupation with continual "churn". The group **726 Metal Trades** did not get a particular mention, though trades of smaller size ("piledrivers" was one example) did. These were predicted to produce supply gaps under the influence of large projects.

071 Managers in Construction & Transportation were mentioned by respondents in both industries as being scarce now and into the future, a scarcity exacerbated by the impact of the Games and Related projects. This was not true of the air industry, facing a serious crisis and about to undergo realignment, but ground transportation, like construction respondents, flagged occupations in that grouping.

666 Cleaners were mentioned in similar terms by the transportation industry.

Mechanics (731 and 732) were occupations mentioned in interviews as being in occasional shortage, which are not on the list—but transportation respondents did not predict a serious or unmanageable impact of the Games and related projects on supplies of mechanics.

The Technology sector's respondents' belief in very minor or no impact likewise seems to be borne out by our findings on the Highest Incremental Labour Demand Occupations lists. This could be due to the current weak market conditions and resulting soft labour market in the sector. Certainly base growth projections are for significant demand for analysts and programmers. Key informants told us that the industry is confident in adequate supply emerging from the programs in training institutions. Should market conditions in this sector improve between now and 2010, significant labour market tightening would occur with resultant shortages.

Another occupation that is projected for heavy base growth, and got a lot of mention, was **Retail Salespersons and Sales Clerks, 642**, also retail middle managers. Our key informants spoke of a growing shortage of appropriate staff for the retail business, both at the entry level and in middle management, but they did not predict any significant impact from the Games and related projects on this situation. The demand for workers will remain serious, and the industry will be attempting to address the situation of "churn" in middle management, and the need to compete with other industries for career-path staff. In general, the

problem is people not seeing retail as a career. The industry will be trying to counter that.

A significant impact identified by retailers was the activity in hospitality/tourism, a sector that competes with retail for entry-level staff – rather than a significant direct increase in business or in labour demand in the retail sector.

Lastly, the tourism and hospitality occupations on our lists were largely acknowledged by respondents we interviewed. **063 Managers** in that sector are seen to be a developing supply gap – difficult to find now, and likely to grow as a shortage, particularly with the impact of the Games and related projects. Most occupations in tourism/hospitality are facing a projected growth in demand, even with base growth in the economy, a situation that looks manageable up to the time of the Games, but increasingly problematic afterwards. Retention and attracting career-oriented people seem to be key issues (not unlike what the construction industry respondents told us about trades, and retail about their staff). Culinary workers, food and beverage, and attendants are in fairly good supply now, but gaps can be seen in the future.

The above brief comments reflect a considerable alignment of the impressions of our key informants with the results of our demand analysis. They also point to areas that can be overlooked (such as the office and clerical occupations). To be sure of projecting and planning for all potential gaps, a methodical analysis of labour supply is the best approach. It should also be kept in mind that these results could be coloured by the current soft labour market due to slow conditions in technology, tourism, etc.

10.3 Next steps

Themes that emerged in Chapter 9 Labour Supply have been reinforced in the above material:

- The need for training and skill development
- The need for basic education
- Promotion of opportunities, by industry,
    - to previously unexpected recruits (employer side)
    - to workers who might not have otherwise considered the work
- Career counselling and awareness (worker side)
- Entrepreneurial opportunities, alternate views of "work" or "employment" as opposed to "having a job"

Another theme is that of incrementality. There is no realistic model for addressing Demand-Supply gaps that is all-at-once; rather, it must be done by incremental steps, and manageable increments, whether in education, skills, career paths, or staff development.

The ongoing need in the labour market for at least high school completion will stay with us, and steps must be continued to facilitate as many people as

possible achieving it, whether through staying in school or through adult education. While there is virtually no demand for "unskilled", which unfortunately is still a significant category on the supply side, the coming labour demand does not include many market opportunities for general post-secondary education either. There is a market for people who analyze and set sights on goals within the industries that will grow. That implies awareness/career choice/counselling, and steps to train, gain skills, upgrade education – whether at post-secondary level or various vocational upgrading.

The good news is that there are lots of opportunities. However, a career path implies learning, whether formal or informal, institutional or on-the-job. Learning (on or off the job) turns so-called dead-end or revolving door jobs into careers.

Nurses are one category of future demand, but a large number of the coming opportunities are not as clearly profiled as "teachers" "nurses", "computer programmers", "new media" have been in different waves of career counselling in the past. A potential worker needs to be able to identify the opportunities and plot a course towards them. Nor are the opportunities clear-cut and obvious. It takes work to discern them.

Likewise, it is not enough for employers just to wait for skills to emerge from the economy or walk in the door. Leaders in the employer sectors have become more analytical and have identified to businesses of all sizes the need to be equally thoughtful and hard working in understanding the gaps in their labour supply, and ways to overcome them.

Some industries are further ahead than others in terms of human resource planning, looking ahead to their skill needs and planning strategies for addressing them. The retail and hospitality sectors for example recognize the need to showcase career path potential. They are paying more attention to how the industry can fill the skills gap, what it can do about retention rates, how flexibility in schedules may pay off in attracting / retaining staff, the potential rewards in looking at non-traditional sources of supply. There are realizations that older workers, Aboriginals, and others who may not have been first thought of when there was a ready supply of part-time student workers, can be much sought-after groups to fill supply gaps.

One of our key informants emphasized the way that workers and employers find each other. It is a human interaction, and subject to error and accident, as well as human perceptions. However, it is the transaction by which hires (matches) are made, one by one. Employers and workers need to come together in these individual market transactions. How to make those function efficiently is the challenge. Several key informants likewise called for planning and consultation, and for leveraging programs that bring different parts of the labour market into planning/analyzing mode.

A number of specialized issues can contribute to labour market gaps. This comment is from the Ministry of Skills Development and Labour's interview

summary: "'creeping credentialism' [is one reason] why certain shortages are projected. The point system in Canadian immigration can serve to exclude qualified individuals in high-demand occupations." In addition, "Examples were given of engineers, nurses and other professionals who are driving taxis or working as Nurses Aides – they have qualifications that are in demand but licensing bodies are utilizing criteria that are inflexible."

Various risks exist if planning does not take place to overcome barriers and BC encounters shortages of skilled people—risks such as increasing labour costs or critical positions going unfilled, thus impeding projects and hiring that depend on them. An industry's labour supply may be affected by changes in other industries too (the retail sector, for example, is concerned about loss of its entry-level workers to a booming tourism sector). A particular issue is the impact of a tight labour market in one region (e.g. the Lower Mainland) on others. If some of the highest-demand occupations are filled by workers migrating from the rest of BC, it leaves extra tightness in critical sectors within regional operations.

In conclusion, the potential for labour shortages in certain industries and occupations does exist, although most observers feel that the situation is manageable through migration or other means. However, this view may be coloured by the current situation in the BC labour market. Now we have no major projects underway and below average activity in tourism and other sectors. The Games and related projects will change this situation. General economic conditions are also likely to increase the pressures on the labour market as will any other major projects in BC or elsewhere.

Therefore, it is important to take steps now to establish the training structures and to inform workers and potential workers about opportunities for learning and employment.

10.4 Recommendations

Below are our recommendations regarding Potential Demand-Supply Gaps.

10.1 Ensure planning and consultation across the economy towards maximizing the efficiency of labour force transactions, and for leveraging programs that bring different parts of the labour market into planning/analyzing mode. (The Provincial Government's Human Resource Strategy initiative is one example, as is the Federal Government's Industrial Adjustment Strategy.)

10.2 Take measures to facilitate the recognition of credentials of qualified immigrant workers and others who are already in BC, and to ensure that licensing bodies are using criteria that are sufficiently flexible.

10.3 Take steps now to establish needed training structures and to inform workers and potential workers about opportunities for learning and employment.

Chapter 11 Conclusion and Recommendations

Having seen the projections of base employment growth (without the 2010 Games and related projects) and having built on those with the projections of labour demand for the games and each project, we have seen the significant impact on BC's economy that the coming years will bring. Our recommendation, in presenting only that information, would be to begin planning for the future now. That would require application of our analysis by the many stakeholders in the labour market, followed by strategic thinking on a great many fronts to ensure that we take advantage of the opportunities.

Our most important conclusion is that coming employment growth will place new pressures on the labour supply of the province, both in metropolitan and non-metropolitan areas which, combined with demographic changes, pose a significant challenge to our labour market's ability to adjust. We also conclude that the important measures to meet the challenge need to begin very soon. They include planning and consultation within and among industries and government to fully address the magnitude of the changes; carefully studying the labour supply to identify more clearly the gaps for which we have identified a potential in this study; ensuring that industries most affected by future growth are strategizing in terms of the training, hiring practices and approaches to the potential labour supply that they will need; and providing developmental capacity in the labour market, such as training, adult education (high school completion), support for workers in making good career choices, a framework for developing apprentices, and support for employers in their strategic human resources planning.

The work of the Human Resources Planning Committee will take the Human Resource Planning Project ahead in the immediate future, with the supply and analyses, and strategy development, that follow this labour demand analysis. We would recommend a broadening of this work to include other stakeholders when the Committee deems it appropriate. The importance of beginning planning, strategy-building, research, and the implementation of measures to improve the labour market's functioning, implies that the Committee's work should begin to be widely known. The magnitude of some of the changes and opportunities leading up to 2010 should begin to be publicized in a clear and focused way to build public consensus on the importance of the planning that needs to take place.

Having examined labour demand, and taken a preliminary look at supply, from a number of specific perspectives, i.e. those of the First Nations partners in the Bid, Vancouver's inner-city Neighbourhoods, special impacts of Volunteering, general supply considerations in the near future, and potential gaps, a number of recommendations have emerged which we will set down all together here in conclusion to this study. The dominant theme is to begin human resource planning in a consultative way, across as many industries and labour sectors as

can be brought to the table. This theme is probably at the heart of most of the recommendations, but there are also many particular aspects of the need to strategize to take advantage of opportunities.

Recommendations from Chapter 3 Labour Demand—Base Growth

3.1 Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply. Develop regional employment projections models for development regions of BC.

3.2 Develop regional employment projections models for development regions of BC.

The growth that is shown in this Chapter is sufficient to merit further work, including supply analysis, both by the Human Resource Planning Committee and by stakeholders in BC's economy.

Recommendations from Chapter 4 Labour Demand—Incremental Growth

[Recommendations on responding to incremental demand were made at the end of Chapter 5 Total Labour Demand]

Recommendations from Chapter 5 Total Labour Demand

5.1 Using these results, begin planning for labour needs early. Undertake, as part of the Human Resource Planning Committee's subsequent study of the labour supply issues, a detailed quantitative analysis of labour supply, as we have described in the report.

5.2 Start training programs now. Involve all players, governments, unions, employers, educational institutions, First Nations.

Recommendations from Chapter 6 First Nations—Supply and Demand

6.1 Ensure full participation and consultation with First Nations in developing and implementing any programs that flow from the Games and related projects, to ensure applicability, and to integrate with extensive and well-developed plans and strategies already in place.

6.2 Conduct a search for examples of successful practices in creating opportunities for First Nations and Indigenous people, in literature about past Games and similar events.

6.3 Continue to facilitate the acquisition of seats for trades training. Some First Nations (e.g. Squamish) have already acquired seats for equipment operators, but with the

analysis in 2 above, there would probably be a decision to target other kinds of skills too.

6.4 Determine the needed level and put in place adequate adult education training and career choice assistance for First Nations.

Recommendations from Chapter 7 Vancouver's inner-city Neighbourhoods—Supply and Demand

7.1 Use the demand information that we have presented in Chapters 3 through 5, applying it to develop a continuum of programs and policies to facilitate preparing the unemployed (including the long-term unemployed) to be able to access employment opportunities.

7.2 Build upon the Ference Weicker recommendation for work following this study: "Prepare an employment strategy for residents of the inner-city neighbourhoods," including a more detailed look at the employability characteristics of the neighbourhoods' populations, either as a group or individually, in light of the detailed analysis of demand/supply.

Recommendations from Chapter 8 2010 Volunteers

8.1 Recognize the crucial strategic importance of volunteers, and recognize volunteer jobs as a valuable resource to be allocated amongst communities, much in the way the paid jobs are.

8.2 Learn from some key strategies from other Games:

- the strategy of mixing volunteers at all levels with highly qualified leaders.
- the strategy of minimizing the distinction between paid and unpaid staff, with a view to maximizing responsibility and accountability of volunteers (but keeping in mind the need to observe the distinction that is important to unions in certain sectors).

8.3 Ensure proper leadership, instruction, support and recognition for volunteers

8.4 Use the Salt Lake City Transfer of Knowledge CD's (available in Bid Corporation library) when detailed information is needed on staffing, jobs, work descriptions. (This source is the most complete, detailed, and compact of any on Olympic Winter Games Human Resources.)

Recommendations from Chapter 9 Labour Supply

9.1 Conduct a comprehensive labour supply analysis, to identify the available supply for the occupations showing the highest incremental labour demand, but also for the "base growth" of Chapter 3. In addition, examine key occupations which show high average annual growth rates (even if actual numbers are small). A more detailed description of the work is given in Chapter 9 Labour Supply.

9.2 Put in place a framework for apprenticeship programs that will attract and retain to completion sufficient numbers of workers to meet current and future growth as well as replace workers who retire or leave a trade.

9.3 Use the opportunity of the Olympics and related projects to promote skilled trades as a career and attract people into the skilled trades — actions for both government and industry. (Construction, other sectors). — From Key Informants, Multiple Sources

9.4 Ensure that maximum efforts are made to "share the wealth"/promote opportunities for areas outside the Lower Mainland. — From Key Informants, Government and Organizations

9.5 Keep a watching brief for major projects in other parts of Canada and elsewhere between now and 2010, which will compete with the BC projects for labour, not only making it more difficult for BC to attract workers from outside the province, but possibly drawing BC workers away.

Recommendations from Chapter 10 Demand-Supply Gaps

10.1 Ensure planning and consultation across the economy towards maximizing the efficiency of labour force transactions, and for leveraging programs that bring different parts of the labour market into planning/analyzing mode. (The Provincial Government's Human Resource Strategy initiative is one example, as is the Federal Government's Industrial Adjustment Strategy.)

10.2 Take measures to facilitate the recognition of credentials of qualified immigrant workers and others who are already in BC, and to ensure that licensing bodies are using criteria that are sufficiently flexible.

10.3 Take steps now to establish needed training structures and to inform workers and potential workers about opportunities for learning and employment.

The above recommendations raise the question of which agencies can carry them out. RKA is not suggesting that the Committee itself or its members undertake all these things. Part of the process of considering them by the Committee may be to decide who could carry them out. The recommendations are based upon RKA's detailed analysis of the relevant literature, the statistical data available and interviews with key people in the relevant fields. We feel that adopting and implementing them will enable British Columbia and its present and future workers to maximize benefits from the 2010 Olympic Games and related projects.

The economic and demographic changes from now to 2015 will mean exciting times for BC. We are perhaps not prepared for the degree of change in the labour market that we are soon going to observe, because recent years have accustomed us to a pattern of supply and demand that has remained somewhat predictable. However, by applying the tools of economic projection as we have

done, we have distinguished a future pattern that is not in this familiar mould. Awareness in this regard should lead to a course of action. RKA would emphasize that the coming economy we see is not only exciting, it is potentially very challenging. We need to embark on the thinking, planning, and preparation for new kinds of challenge that will turn risks into opportunities. The rigour, as well as the inclusiveness and social responsibility of an event like the 2010 Games serve as a model for BC to approach this future.

Appendix A Appendix A—List of Key Informants

RKA is grateful to the following people, who agreed to participate in interviews in support of our research. A list of recommendations made by key informants may be found in Appendix E.

Committee Members/Stakeholder Representatives

Kerry Jothen (Chair), CEO,
Human Capital Strategies

John McLaughlin, VP, Finance and
Chief Financial Officer
Vancouver 2010 Bid Corporation

Janice Mansfield
Ministry of Skills Development and
Labour

Christine Baker
Squamish Nation Stitsma Employment

Andrew Lane, Manager
LMDA Secretariat

David LePage, Executive Director
Fast Track to Employment

Isobel Donavan, Asifa Lalji
Vancouver Agreement Coordination Unit

Robert Gilson, Executive Director
Tradeworks Training Society

Pam Coulee
Community Development Worker

Key Industry Sector Representatives

Construction

David Podmore, President & CEO
Concert Properties Ltd.

Philip Hochstein, Executive VP,
Gordon Stewart,
Independent Contractors and
Businesses Association

Retail

Mark Startup, CEO
Retail Merchants Association of BC

Ed DesRoches, owner
Plum Clothing

Kevin Evans, VP,
Retail council of Canada

Technology

George Hunter, Executive Director
BC Technology Industries Association

Matthew Handford, VP Products
Crystal Decisions

Tourism

Rick Lemon, VP Tourism Operations
Tourism BC

Stephen Darling, General Manager
Westin Grand Vancouver

Transportation

Ruth Buhagar, Recruitment Manager
Air Canada,

Alf Gale, Operations Manager,
Pacific Coach Lines

Lori Lindahl, Director, Human
Resources
Port of Vancouver

Appendix B Appendix B—Committee Members

Members of the 2010 Winter Games Human Resources Planning Committee

Deborah Ainsworth
Director, Federal & Provincial
Partnerships Branch
Ministry of Human Resources (BC)

Christine Baker
Squamish Nation Stitsma Employment

Juanita Berkhout
Coordinator, Aboriginal Post-Secondary
Programs
Ministry of Advanced Education (BC)

Richard Debeck
Labour Market Consultant
Human Resources Development
Canada, BC/Yukon Region

Isobel Donavan
Executive Coordinator
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Robert Gilson
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Gordon Goodman
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Rick Lemon
Vice President, Tourism Operations
Tourism British Columbia

David LePage
Executive Director
Fast Track to Employment

Christine Leo
Director, Community Advancement
Programs
Lil'wat Employment Agency

Betty Notar
Assistant Deputy Minister, Skills
Development & Workplace Programs
Ministry of Skills Development and
Labour (BC)

Appendix C —Employment Growth by Industry

Table C-0 Base Employment Demand by Industry, 2003 to 2015

Table C-0

Total Openings in Base Model by Industry, 2003 to 2015

COPS Industries	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Agriculture	1,492	1,036	901	1,036	427	351	418	358	375	371	367	363	359	7,854
Fishing & Trapping	149	144	169	254	116	91	135	169	132	132	132	131	131	1,886
Logging and Forestry	133	882	1,149	1,050	594	410	367	467	415	414	412	410	408	7,111
Mining, Quarries & Sand Pits	168	232	266	311	164	186	162	147	167	167	166	166	166	2,469
Crude Petroleum, Gas Mining & Coal	37	-7	41	28	31	54	39	40	45	46	47	47	48	498
Mining Services	-22	-5	57	61	40	63	88	123	92	92	92	92	91	864
Food Products & Beverages	479	489	455	609	492	433	530	593	528	529	530	531	532	6,731
Rubber, Plastics & Chemicals	407	327	265	239	117	166	247	262	228	227	227	226	226	3,162
Pulp and Paper, Paper Products	112	564	674	693	760	633	647	803	727	740	753	767	781	8,652
Wood	154	1,747	2,554	2,310	1,371	1,013	920	1,224	1,068	1,067	1,066	1,064	1,063	16,620
Printing and Publishing	895	755	673	674	488	452	517	593	530	532	534	537	539	7,719
Manufactured Mineral Products	666	557	555	533	373	354	337	366	358	358	358	359	359	5,532
Metal Fabrication & Machinery, except electrical	767	703	756	651	556	210	259	508	330	328	326	325	323	6,042
Motor Vehicles, Trailers & Parts	78	113	24	188	99	26	-54	26	0	0	0	0	0	501
Other Transportation Equipment	-48	122	204	603	499	554	410	780	637	664	693	723	754	6,596
Electrical & Electronic Products	406	377	512	370	-57	87	324	363	265	267	268	270	271	3,723
Other Manufacturing	520	638	706	973	519	430	682	1,062	745	750	754	759	763	9,302
Construction	3,075	5,953	5,668	4,912	5,353	5,338	5,168	2,944	4,593	4,639	4,686	4,733	4,781	61,843
Transportation & Storage	3,782	3,580	3,956	4,563	4,251	4,035	3,627	4,112	4,187	4,249	4,312	4,376	4,440	53,471
Communication	1,350	1,225	1,065	1,037	483	420	751	928	709	707	704	702	700	10,781
Utilities	390	643	587	742	611	628	490	560	578	586	593	601	608	7,617
Wholesale Trade	4,917	4,180	4,406	4,601	3,526	3,601	3,539	3,644	3,674	3,718	3,763	3,809	3,855	51,233
Retail Trade	16,775	13,842	12,486	11,808	6,906	6,574	5,317	6,040	6,008	6,025	6,042	6,060	6,077	109,961
Finance, Insurance, & Real Estate	2,681	4,408	4,465	4,523	3,788	3,325	3,477	3,810	3,596	3,614	3,631	3,649	3,667	48,633
Advertising	667	393	493	485	391	382	426	310	387	391	395	398	402	5,520
Professional Business Services	1,525	3,854	3,445	3,529	2,583	2,401	2,076	2,702	2,456	2,471	2,487	2,502	2,518	34,547
Computer, Consulting and Other Business Services	5,316	4,053	5,056	4,956	4,848	5,085	5,144	4,284	5,355	5,512	5,673	5,839	6,010	67,132
Public Administration	2,107	3,216	2,831	2,985	2,041	1,792	2,086	2,126	2,030	2,027	2,023	2,020	2,017	29,301
Education	5,172	6,222	5,624	4,807	2,675	3,878	4,160	4,039	4,126	4,123	4,119	4,116	4,113	57,175
Health Services	4,346	9,743	9,940	10,240	8,019	8,533	8,165	8,655	8,991	9,119	9,249	9,381	9,515	113,898
Accommodation, Food & Recreational Services	6,874	9,707	7,662	10,004	6,916	6,841	8,860	9,063	8,580	8,730	8,883	9,039	9,197	110,355
Personal & Household Services	2,312	2,309	2,066	2,495	1,063	1,523	2,075	2,203	2,003	2,031	2,059	2,088	2,117	26,345
Other Services Industries	2,470	3,038	2,575	2,941	2,056	1,986	2,143	2,200	2,142	2,151	2,161	2,170	2,180	30,213
All Industries	70,152	85,038	82,285	85,211	62,103	61,856	63,533	65,506	66,056	66,775	67,507	68,252	69,011	913,285

Table C-1 Incremental Employment Demand from 2010 Games by Industry, 2003 to 2015

Table C-1

Incremental Employment Demand from 2010 Games by Industry, 2003 to 2015

COPS Industries	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Agriculture	0	0	2	6	6	37	55	190	38	28	28	23	18	433
Fishing & Trapping	0	0	0	0	0	2	3	9	2	1	1	1	1	21
Logging and Forestry	1	1	4	11	12	16	28	34	2	1	1	1	1	113
Mining, Quarries & Sand Pits	0	0	1	2	2	4	7	18	1	1	1	0	0	37
Crude Petroleum, Gas Mining & Coal	0	0	0	0	0	1	2	5	1	1	1	1	0	12
Mining Services	0	0	0	0	0	1	1	4	1	0	0	0	0	9
Food Products & Beverages	0	1	3	8	9	61	89	320	65	48	47	39	31	723
Rubber, Plastics & Chemicals	0	1	4	10	10	25	39	91	15	11	11	9	7	232
Pulp and Paper, Paper Products	0	0	2	6	6	14	22	50	8	6	6	5	4	129
Wood	2	3	14	34	36	48	82	95	3	2	2	2	1	324
Printing and Publishing	2	3	19	46	50	114	180	390	66	50	48	40	32	1,041
Manufactured Mineral Products	0	1	3	7	8	15	25	54	5	4	4	3	2	131
Metal Fabrication & Machinery, except electrical	0	1	4	10	11	19	31	54	6	4	4	4	3	152
Motor Vehicles, Trailers & Parts	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Transportation Equipment	0	0	1	2	2	6	9	24	4	3	3	3	2	58
Electrical & Electronic Products	0	0	1	2	2	5	8	14	2	2	2	1	1	39
Other Manufacturing	31	47	248	613	662	868	1,478	1,673	41	31	30	25	20	5,768
Construction	8	13	63	160	173	299	509	968	64	48	47	39	31	2,420
Transportation & Storage	3	5	27	66	71	418	613	2,163	422	317	308	256	205	4,873
Communication	8	12	63	156	168	250	415	572	52	39	38	32	25	1,831
Utilities	0	0	2	6	6	19	28	73	14	10	10	8	7	185
Wholesale Trade	4	6	29	71	77	213	330	850	148	111	106	90	72	2,106
Retail Trade	6	9	45	111	120	653	963	3,187	645	483	469	391	313	7,394
Finance, Insurance, & Real Estate	7	10	53	131	141	316	498	1,075	179	134	130	108	87	2,868
Advertising	3	5	28	69	75	106	177	223	16	12	11	10	8	742
Professional Business Services	21	32	168	414	448	633	1,061	1,338	94	71	69	57	46	4,452
Computer, Consulting and Other Business Services	10	16	84	207	224	317	530	669	47	35	34	29	23	2,226
Public Administration	1	1	5	13	15	44	68	175	34	25	24	20	16	443
Education	0	1	3	8	9	24	37	93	17	13	12	10	8	236
Health Services	1	1	6	15	16	43	66	159	28	21	21	17	14	408
Accommodation, Food & Recreational Services	17	26	138	341	369	3,067	4,437	15,011	3,358	2,516	2,444	2,035	1,629	35,389
Personal & Household Services	1	1	6	14	15	46	71	187	35	26	25	21	17	465
Other Services Industries	3	4	20	50	54	158	243	617	114	86	83	69	55	1,557
All Industries	130	200	1,048	2,591	2,801	7,842	12,106	30,382	5,524	4,139	4,021	3,349	2,681	76,813

Table C-2 Incremental Employment Demand from VCEC Expansion by Industry, 2003 to 2015

Table C-2

Incremental Employment Demand from VCEC Expansion by Industry, 2003 to 2015

COPS Industries	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Agriculture	0	2	7	9	2	12	16	19	22	24	26	29	29	198
Fishing & Trapping	0	0	1	1	0	0	1	1	1	1	1	1	1	9
Logging and Forestry	0	1	4	5	1	1	1	1	1	1	1	1	1	20
Mining, Quarries & Sand Pits	0	2	8	10	2	1	1	1	1	1	1	1	1	30
Crude Petroleum, Gas Mining & Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mining Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Products & Beverages	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber, Plastics & Chemicals	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pulp and Paper, Paper Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Printing and Publishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manufactured Mineral Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metal Fabrication & Machinery, except electrical	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Motor Vehicles, Trailers & Parts	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Transportation Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical & Electronic Products	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Manufacturing	12	61	212	273	61	52	71	85	99	108	116	127	128	1,404
Construction	77	385	1,348	1,733	385	14	19	22	26	28	30	33	33	4,135
Transportation & Storage	2	9	33	42	9	162	218	261	305	332	359	391	394	2,518
Communication	1	6	20	25	6	12	16	19	22	24	26	29	29	235
Utilities	0	2	7	9	2	4	6	7	8	9	9	10	10	83
Wholesale Trade	6	28	97	124	28	49	66	79	92	100	108	117	118	1,009
Retail Trade	7	36	125	161	36	96	129	155	181	197	213	232	234	1,801
Finance, Insurance, & Real Estate	6	28	99	127	28	69	93	112	130	142	153	167	168	1,321
Advertising	2	12	42	54	12	18	25	30	35	38	41	45	45	397
Professional Business Services	14	71	250	321	71	111	149	179	208	227	245	267	269	2,383
Computer, Consulting and Other Business Services	7	36	125	161	36	55	75	89	104	113	123	134	135	1,192
Public Administration	2	9	31	40	9	11	14	17	20	22	24	26	26	251
Education	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Health Services	1	5	16	21	5	6	8	9	11	12	13	14	14	136
Accommodation, Food & Recreational Services	4	19	66	85	19	772	1,040	1,246	1,453	1,582	1,711	1,864	1,877	11,737
Personal & Household Services	2	11	39	50	11	56	76	91	106	115	125	136	137	954
Other Services Industries	3	13	47	61	13	47	64	77	89	97	105	115	115	847
All Industries	147	736	2,575	3,311	736	1,548	2,086	2,500	2,914	3,173	3,431	3,738	3,765	30,660

Table C-3 Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Industry, 2003 to 2009

Table C-3

Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Industry, 2003 to 2009

COPS Industries	2003	2004	2005	2006	2007	2008	2009	Total
Agriculture	0	1	4	4	4	3	1	19
Fishing & Trapping	0	0	0	0	0	0	0	2
Logging and Forestry	0	0	2	2	2	1	0	7
Mining, Quarries & Sand Pits	2	12	44	44	44	29	11	188
Crude Petroleum, Gas Mining & Coal	0	0	1	1	1	1	0	3
Mining Services	0	0	1	1	1	1	0	6
Food Products & Beverages	0	1	5	5	5	3	1	21
Rubber, Plastics & Chemicals	0	1	3	3	3	2	1	13
Pulp and Paper, Paper Products	0	1	4	4	4	2	1	16
Wood	0	1	3	3	3	2	1	12
Printing and Publishing	0	3	10	10	10	7	3	44
Manufactured Mineral Products	3	17	63	63	63	42	16	266
Metal Fabrication & Machinery, except electrical	1	8	27	27	27	18	7	116
Motor Vehicles, Trailers & Parts	0	0	0	0	0	0	0	0
Other Transportation Equipment	0	0	1	1	1	1	0	6
Electrical & Electronic Products	0	1	4	4	4	3	1	18
Other Manufacturing	0	2	6	6	6	4	2	27
Construction	61	391	1,423	1,423	1,423	945	361	6,028
Transportation & Storage	1	9	34	34	34	23	9	145
Communication	1	5	18	18	18	12	5	76
Utilities	0	1	4	4	4	2	1	15
Wholesale Trade	3	19	70	70	70	47	18	297
Retail Trade	4	26	94	94	94	63	24	399
Finance, Insurance, & Real Estate	3	21	76	76	76	51	19	324
Advertising	1	5	19	19	19	13	5	80
Professional Business Services	5	31	114	114	114	76	29	482
Computer, Consulting and Other Business Services	2	16	57	57	57	38	14	241
Public Administration	0	3	10	10	10	6	2	41
Education	0	2	8	8	8	6	2	35
Health Services	1	4	13	13	13	9	3	56
Accommodation, Food & Recreational Services	2	13	48	48	48	32	12	205
Personal & Household Services	1	4	13	13	13	9	3	54
Other Services Industries	2	14	49	49	49	33	12	208
All Industries	96	613	2,231	2,231	2,231	1,482	566	9,449

Tables C4-A and C-4B Incremental Employment Demand from RAV Rapid Transit by Industry, 2004 to 2009 (Low and High Estimates)

Table C-4A

Incremental Employment Demand from RAV Rapid Transit by Industry, 2004 to 2009 (Low Estimate)

COPS Industries	2004	2005	2006	2007	2008	2009	Total
Agriculture	2	5	9	15	11	3	45
Fishing & Trapping	0	0	1	1	1	0	4
Logging and Forestry	2	5	10	15	11	3	46
Mining, Quarries & Sand Pits	3	7	14	22	16	5	66
Crude Petroleum, Gas Mining & Coal	0	0	0	1	0	0	2
Mining Services	0	0	1	1	1	0	3
Food Products & Beverages	2	6	12	18	14	4	56
Rubber, Plastics & Chemicals	2	4	8	12	9	3	37
Pulp and Paper, Paper Products	1	2	4	6	4	1	17
Wood	3	8	15	23	18	5	72
Printing and Publishing	4	9	18	28	21	6	86
Manufactured Mineral Products	2	4	9	14	10	3	42
Metal Fabrication & Machinery, except electrical	16	41	81	127	97	27	389
Motor Vehicles, Trailers & Parts	0	0	0	0	0	0	0
Other Transportation Equipment	1	2	3	5	4	1	16
Electrical & Electronic Products	9	22	45	69	53	15	213
Other Manufacturing	4	9	18	28	21	6	85
Construction	222	559	1,113	1,729	1,322	374	5,318
Transportation & Storage	9	23	45	70	54	15	216
Communication	6	15	29	46	35	10	140
Utilities	1	3	6	9	7	2	29
Wholesale Trade	39	99	197	306	234	66	942
Retail Trade	36	90	179	277	212	60	853
Finance, Insurance, & Real Estate	23	59	118	183	140	39	562
Advertising	6	15	30	47	36	10	145
Professional Business Services	36	92	183	284	217	61	873
Computer, Consulting and Other Business Services	18	46	91	142	108	31	436
Public Administration	3	7	14	22	17	5	69
Education	4	9	18	27	21	6	84
Health Services	6	15	31	47	36	10	146
Accommodation, Food & Recreational Services	22	55	110	170	130	37	524
Personal & Household Services	6	16	32	49	38	11	151
Other Services Industries	12	30	60	94	72	20	289
All Industries	498	1,256	2,502	3,888	2,972	840	11,957

Table C-4B

Incremental Employment Demand from RAV Rapid Transit by Industry, 2004 to 2009 (High Estimates)

COPS Industries	2004	2005	2006	2007	2008	2009	Total
Agriculture	2	6	12	18	14	4	55
Fishing & Trapping	0	1	1	2	1	0	5
Logging and Forestry	3	6	13	20	15	4	62
Mining, Quarries & Sand Pits	4	11	22	34	26	7	106
Crude Petroleum, Gas Mining & Coal	0	0	1	1	1	0	3
Mining Services	0	0	1	1	1	0	4
Food Products & Beverages	3	7	14	22	17	5	68
Rubber, Plastics & Chemicals	2	6	12	19	15	4	59
Pulp and Paper, Paper Products	1	3	5	8	6	2	25
Wood	4	11	21	33	25	7	100
Printing and Publishing	4	11	22	34	26	7	105
Manufactured Mineral Products	3	7	13	21	16	4	63
Metal Fabrication & Machinery, except electrical	26	64	128	199	152	43	612
Motor Vehicles, Trailers & Parts	0	0	0	0	0	0	0
Other Transportation Equipment	1	2	5	7	6	2	23
Electrical & Electronic Products	16	40	79	122	94	26	377
Other Manufacturing	5	14	27	43	33	9	131
Construction	263	663	1,321	2,052	1,569	444	6,311
Transportation & Storage	12	31	61	95	72	20	292
Communication	7	18	37	57	44	12	176
Utilities	2	4	8	12	9	3	37
Wholesale Trade	62	156	311	483	369	104	1,484
Retail Trade	43	109	218	338	259	73	1,041
Finance, Insurance, & Real Estate	28	70	139	217	166	47	666
Advertising	6	16	32	50	38	11	155
Professional Business Services	39	98	194	302	231	65	928
Computer, Consulting and Other Business Services	19	49	97	151	115	33	464
Public Administration	4	9	18	28	21	6	85
Education	4	10	21	32	25	7	99
Health Services	7	18	37	57	44	12	175
Accommodation, Food & Recreational Services	26	66	132	206	157	44	633
Personal & Household Services	8	19	38	59	45	13	181
Other Services Industries	15	37	74	115	88	25	352
All Industries	620	1,563	3,114	4,837	3,698	1,046	14,877

Appendix D —Employment Growth by Occupation

Table D-0 Base Employment Demand by Occupation, 2003 to 2015

Table D-0

Total Openings in Base Model by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
001 Legislators & Senior Management	381	781	1,102	868	1,084	-159	422	-696	59	334	338	342	346	5,202
011 Administrative Services Managers	-7	729	1,201	160	1,688	-375	1,783	-496	543	500	506	511	517	7,260
012 Managers in Financial / Business Services	90	744	341	505	543	251	459	354	468	410	414	418	421	5,417
013 Managers in Communication (Except Broadcasting)	-21	264	17	166	36	51	67	49	62	51	52	52	52	899
021 Engineering / Science / Information Systems Mgr's	-203	682	59	414	437	150	678	53	286	266	271	275	280	3,648
031 Health / Education / Social & Community Services Mgr's	-3,136	3,714	-2,085	2,595	-4,312	5,617	-5,513	6,581	652	453	457	460	464	5,947
041 Managers in Public Administration	153	143	154	157	19	10	209	40	110	72	72	72	72	1,460
051 Art / Culture / Recreation / Sport Managers	-31	146	66	131	135	-15	186	-5	78	70	70	71	72	975
061 Sales, Marketing & Advertising Managers	-408	446	1,100	-85	1,221	155	535	831	565	548	555	562	569	6,593
062 Managers in Retail Trade	2,336	2,763	2,429	2,052	1,979	1,409	1,409	1,586	1,461	1,187	1,193	1,198	1,203	22,206
063 Managers in Food Service & Accommodation	745	1,972	1,119	1,648	2,635	234	2,775	787	1,339	1,162	1,181	1,201	1,221	18,019
064 Managers in Protective Service	14	49	25	22	25	17	14	25	24	14	14	14	14	271
065 Managers in Other Services	213	158	172	146	192	12	295	3	120	112	113	115	116	1,767
071 Managers in Construction & Transportation	612	643	675	703	734	766	797	823	836	641	648	656	663	9,197
072 Facility Operation & Maintenance Managers	9	266	302	108	399	23	431	75	182	163	165	167	169	2,458
081 Primary Production Managers	2	-13	90	11	40	12	36	22	30	19	19	19	19	307
091 Managers in Manufacturing & Utilities	226	545	363	483	284	330	235	368	322	240	242	244	247	4,130
111 Auditors / Accountants / Investment Professionals	2,018	2,497	2,570	1,911	2,329	2,014	1,983	2,437	1,473	1,586	1,600	1,614	1,629	25,661
112 Human Resources & Business Service Professionals	1,430	408	1,023	914	840	641	970	946	813	642	654	666	678	10,623
121 Clerical Supervisors	1,218	761	1,608	343	1,501	33	1,554	461	634	584	589	595	600	10,481
122 Administrative & Regulatory Occ's	1,598	1,675	1,940	2,066	859	2,168	982	1,582	1,220	1,247	1,260	1,274	1,288	19,159
123 Finance & Insurance Administrative Occ's	726	942	894	941	995	1,003	1,066	1,106	1,107	895	903	911	920	12,409
124 Secretaries, Recorders & Transcriptionists	-617	2,211	1,642	2,545	234	1,035	102	1,315	1,273	1,159	1,169	1,179	1,190	14,437
141 Clerical Occ's, General Office Skills	1,023	681	1,047	936	726	654	822	573	1,008	1,137	1,152	1,167	1,182	12,108
142 Office Equipment Operators	610	292	359	397	437	277	444	199	360	413	418	424	430	5,058
143 Finance & Insurance Clerks	1,171	1,700	2,376	2,331	970	1,233	1,460	40	609	1,441	1,454	1,467	1,480	17,731
144 Administrative Support Clerks	1,127	956	805	810	702	656	604	704	733	701	707	714	720	9,940
145 Library, Correspondence & Related Info. Clerks	888	658	281	774	329	351	371	228	448	521	526	532	538	6,446
146 Mail & Message Distribution Occ's	475	546	265	277	172	226	143	346	304	271	271	272	273	3,841
147 Recording / Scheduling / Distributing Occ's	1,214	816	853	1,104	1,070	318	781	511	846	931	941	952	962	11,298
211 Physical Science Professionals	217	-19	230	116	39	143	32	83	89	95	96	97	97	1,314
212 Life Science Professionals	116	130	127	133	127	136	131	142	139	160	163	166	168	1,840
213 Civil / Mechanical / Electrical / Chemical Engineers	501	492	719	491	569	640	450	663	522	442	447	452	456	6,843
214 Other Engineers	472	331	568	392	435	493	317	487	361	376	382	389	395	5,398
215 Architects / Urban Planners / Land Surveyors	104	115	181	148	56	194	-21	173	122	127	128	129	130	1,588
216 Mathematicians / Analysts / Programmers	3,218	2,302	2,104	2,442	2,267	1,270	2,605	1,326	1,569	2,167	2,215	2,264	2,314	28,062
221 Technical Occ's in Physical Sciences	39	141	98	109	82	95	54	118	95	103	103	104	105	1,246
222 Technical Occ's in Life Sciences	161	203	315	237	217	220	170	222	225	226	228	230	232	2,883
223 Civil / Mechanical / Industrial Engineering Technicians	140	233	214	202	239	206	216	255	231	188	190	192	194	2,703
224 Electronics / Electrical Engineering Technicians	1,321	755	771	558	926	678	842	719	615	731	743	755	768	10,182
225 Tech. Occ's in Architecture / Drafting / etc.	325	298	275	401	202	326	333	272	287	234	236	238	240	3,670
226 Other Technical Inspectors / Regulatory Officers	127	142	147	158	168	150	187	194	181	138	139	140	142	2,013
227 Transportation Officers & Controllers	251	255	18	359	103	186	101	259	161	152	154	156	158	2,315
311 Physicians / Dentists / Veterinarians	408	425	444	459	480	503	523	545	554	510	517	524	531	6,423
312 Optometrists / Chiropractors / Other Health Professions	47	49	51	53	56	59	61	64	65	64	65	66	67	766
313 Pharmacists, Dietitians & Nutritionists	115	119	124	130	136	143	149	155	157	110	111	112	113	1,673
314 Therapy & Assessment Professionals	14	232	376	78	307	135	315	83	217	224	227	230	233	2,670
315 Nurse Supervisors & Registered Nurses	1,103	1,120	1,223	1,236	1,323	1,372	1,457	1,493	1,533	1,281	1,299	1,317	1,336	17,094
321 Medical Technologists / Technicians	206	323	323	332	361	366	403	405	422	415	421	427	433	4,837
322 Tech. Occ's in Dental Health Care	113	41	92	70	78	77	85	84	91	111	113	114	116	1,184

Table D-0

Total Openings in Base Model by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
323 Other Tech. Occ's in Health (Except Dental)	254	594	591	500	680	444	628	577	597	583	591	599	607	7,246
341 Assisting Occ's in Health Services	1,048	929	1,780	1,042	1,447	1,055	1,484	1,032	1,269	1,297	1,316	1,335	1,354	16,388
411 Judges / Lawyers / Notaries	487	327	345	360	375	387	401	414	418	347	350	353	355	4,919
412 University Professors & Assistants	891	182	692	434	77	541	177	349	284	371	371	370	370	5,111
413 College & Other Voc. Instructors	-139	760	1,213	548	284	483	922	543	531	460	464	467	471	7,007
414 Secondary / Elementary School Teachers & Counsellors	2,820	2,869	1,584	2,609	1,303	1,811	1,718	2,081	1,936	1,613	1,612	1,611	1,610	25,176
415 Psychologists / Social Workers / Clergy	766	321	869	619	485	612	682	460	629	583	589	595	602	7,811
416 Policy & Program Officers	1,094	260	805	585	668	549	644	662	649	530	537	544	551	8,077
421 Paralegals / Social Services Workers / etc.	185	922	1,225	875	692	703	920	601	697	907	917	928	939	10,510
511 Librarians, Archivists, Conservators & Curators	75	63	72	66	62	66	67	70	69	58	58	59	59	842
512 Writing / Translating / Public Relations Professionals	571	309	429	375	313	352	333	394	352	380	384	388	393	4,973
513 Creative & Performing Artists	385	692	455	570	454	411	416	509	407	449	454	460	465	6,127
521 Technical Occ's. Libraries / Archives / etc.	88	55	66	61	53	58	55	57	57	61	61	61	62	796
522 Photographers / Graphic Arts Technicians / etc.	158	389	173	337	346	241	248	293	196	241	245	249	253	3,370
523 Announcers & Other Performers	44	48	62	70	19	43	31	73	30	48	48	49	50	614
524 Creative Designers & Craftspersons	406	409	401	474	373	368	356	405	407	404	410	416	423	5,250
525 Athletes, Coaches, Referees & Related Occ's	271	532	540	480	502	339	490	641	318	520	527	535	542	6,237
621 Sales & Service Supervisors	2,298	1,060	1,559	1,436	1,232	1,126	1,124	1,161	1,062	963	973	983	994	15,970
622 Technical Sales Specialists, Wholesale Trade	483	1,231	648	678	631	376	775	738	552	640	647	655	662	8,716
623 Insurance & Real Estate Sales Occ's	637	782	813	905	752	786	798	835	868	694	698	702	706	9,976
624 Chefs & Cooks	717	2,261	809	1,487	1,713	393	2,088	1,970	1,386	1,414	1,438	1,462	1,486	18,623
625 Butchers & Bakers	571	367	298	264	141	160	174	179	213	207	208	210	212	3,203
626 Police Officers & Firefighters	242	245	255	261	265	269	277	286	288	254	254	254	254	3,403
627 Technical Occ's in Personal Service	500	502	503	541	520	535	556	575	562	577	584	593	601	7,148
641 Sales Rep's, Wholesale Trade	2,258	1,292	819	1,821	744	1,323	990	615	903	877	887	897	908	14,335
642 Retail Salespersons & Sales Clerks	3,864	3,890	3,531	3,066	2,051	1,555	1,647	1,366	1,636	1,868	1,876	1,885	1,894	30,128
643 Occ's in Travel & Accommodation	402	269	522	354	399	374	336	367	425	457	463	469	475	5,311
644 Tour & Rec. Guides & Amuse. Occ's	28	9	33	28	31	11	34	26	27	31	31	31	32	349
645 Occ's in Food & Beverage Service	871	1,542	1,393	929	730	68	808	1,852	1,296	1,638	1,666	1,695	1,724	16,213
646 Other Occ's in Protective Service	-60	328	-53	261	16	65	145	90	112	119	119	120	121	1,384
647 Childcare & Home Support Workers	2,487	1,387	1,719	1,275	1,443	1,299	1,397	1,188	1,512	1,847	1,869	1,891	1,913	21,227
648 Other Occ's in Personal Service	160	341	275	224	300	157	203	240	194	233	236	239	242	3,046
661 Cashiers	2,477	1,113	2,087	1,584	533	831	868	849	1,612	1,219	1,228	1,238	1,248	16,906
662 Other Sales & Related Occ's	929	1,385	1,028	1,223	543	401	405	324	613	815	823	831	839	10,158
663 Elemental Med. & Hospital Assistants	149	103	106	-47	95	121	111	7	84	79	80	81	82	1,052
664 Food Counter Attendants & Helpers	1,923	248	1,463	3,914	-1,833	1,818	770	216	1,380	1,502	1,526	1,551	1,576	16,055
665 Security Guards & Related Occ's	927	595	403	843	174	469	201	265	412	498	509	521	533	6,351
666 Cleaners	2,257	1,492	4,375	2,221	2,652	1,340	2,200	921	1,915	1,829	1,847	1,865	1,883	26,798
667 Travel / Accommodation / Recreation Attendants	547	-179	396	211	44	201	267	-67	177	224	227	231	235	2,515
668 Other Elemental Service Occ's	242	483	108	-97	339	350	16	1	246	231	234	238	241	2,633
721 Contractors & Supervisors, Trades & Related	1,168	1,721	835	1,309	1,149	945	942	776	944	812	820	827	835	13,083
722 Supervisors- Railway & Motor Trans	248	65	249	282	190	217	235	217	219	201	204	207	210	2,744
723 Machinists & Related Occ's	59	-83	233	239	-29	144	126	23	137	144	146	149	152	1,439
724 Electrical Trades & Telecommunications Occ's	553	571	582	581	573	570	599	640	624	573	578	584	589	7,617
725 Plumbers, Pipefitters & Gas Fitters	130	382	253	320	255	296	218	199	254	267	269	272	275	3,391
726 Metal Forming / Shaping / Erecting Occ's	-1	308	121	185	182	178	147	113	141	145	146	148	150	1,962
727 Carpenters & Cabinetmakers	592	612	628	647	670	693	719	742	754	619	625	630	636	8,566
728 Masonry & Plastering Trades	486	339	411	277	306	328	315	199	267	282	285	288	291	4,074
729 Other Construction Trades	342	556	438	387	373	434	419	216	339	396	400	404	408	5,111
731 Machinery / Transportation Equipment Mechanics	694	740	833	981	601	685	613	945	755	718	726	733	741	9,765

Table D-0

Total Openings in Base Model by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
732 Motor Vehicle Mechanics	1,004	1,263	750	990	693	422	657	386	536	585	588	592	595	9,061
733 Other Mechanics	54	209	130	188	141	143	111	124	123	117	119	120	121	1,700
734 Upholsterers / Tailors / Shoe Repairers / etc.	297	250	207	202	126	225	117	228	197	136	137	138	139	2,399
735 Stationary Engineers / Power System Operators	-40	49	142	194	5	69	147	97	110	102	103	104	105	1,185
736 Train Crew Operating Occ's	28	0	41	56	28	31	37	36	65	63	64	65	66	577
737 Crane Operators, Drillers & Blasters	25	235	72	118	66	157	62	35	67	63	64	64	65	1,093
738 Printing Press Operators / Commercial Divers / etc.	333	127	287	151	105	289	39	273	143	152	154	156	157	2,368
741 Motor Vehicle & Transit Drivers	1,407	3,907	2,019	3,355	2,328	2,531	1,958	2,757	2,515	2,492	2,524	2,556	2,589	32,940
742 Heavy Equipment Operators	253	311	348	349	343	364	354	405	404	357	360	364	367	4,581
743 Other Transport Equipment Operators	92	148	127	127	108	103	81	114	115	134	135	138	140	1,564
744 Other Installers / Repairers / Servicers	419	333	344	360	150	153	192	220	201	255	257	259	262	3,405
745 Longshore Workers & Material Handlers	654	462	738	1,080	269	689	510	630	610	688	696	704	712	8,442
761 Trades Helpers & Labourers	17	144	278	140	497	171	414	38	386	414	418	422	427	3,767
762 Public Works & Other Labourers	440	-331	593	-427	795	-817	1,213	-1,272	83	80	81	82	83	603
821 Supervisors, Logging & Forestry	-15	132	144	174	92	67	54	58	65	50	50	50	50	973
822 Supervisors, Mining / Oil / Gas	44	47	49	50	52	54	55	57	58	37	38	38	38	615
823 Underground Miners / Oil & Gas Drillers / etc.	71	75	77	80	82	85	87	89	90	63	63	63	63	989
824 Logging Machinery Operators	203	88	340	197	118	52	39	55	72	70	70	69	69	1,441
825 Contractors / Operators / Supervisors: Agriculture	924	1,108	870	617	959	277	354	1,013	451	371	370	369	368	8,052
826 Fishing Vessel Masters & Skippers	155	139	47	262	25	49	111	63	89	88	88	88	87	1,293
841 Mine Service Workers & Operators in Oil	14	18	23	19	21	17	21	18	20	20	20	20	20	249
842 Logging & Forestry Workers	13	196	352	246	121	108	51	107	96	109	108	108	108	1,723
843 Agriculture & Horticulture Workers	145	153	95	-38	74	-192	-103	213	62	125	125	125	124	907
844 Other Fishing & Trapping Occ's	21	22	21	23	21	21	21	22	21	18	18	18	18	265
861 Primary Production Labourers	-40	433	103	172	74	224	223	317	186	288	291	293	295	2,861
921 Supervisors, Processing Occ's	470	370	388	338	334	196	208	311	272	207	208	209	210	3,721
922 Supervisors, Assembly & Fabrication	169	286	-33	230	211	123	99	336	179	143	145	147	148	2,183
923 Central Control Operators: Manufacturing / Processing	18	18	47	79	38	45	54	69	59	54	54	55	55	644
941 Machine Operators: Metal & Mineral Products	50	41	158	192	94	27	77	112	77	86	87	87	87	1,175
942 Machine Operators: Chemical / Plastic / Rubber	111	91	70	123	-43	88	5	135	79	92	93	93	94	1,032
943 Machine Operators: Pulp & Paper Prod	280	691	806	747	334	321	160	429	332	412	416	419	423	5,770
944 Machine Operators: Textile Processing	-12	67	29	104	2	-9	130	54	45	53	54	54	54	626
945 Machine Operators: Fabric / Fur / Leather	147	27	164	267	78	104	86	205	178	160	161	162	163	1,905
946 Machine Operators: Food / Beverage / Tobacco	322	113	185	199	161	123	168	151	146	155	156	156	156	2,191
947 Printing Machine Operators & Related Occ's	-256	376	57	9	275	-40	46	190	85	96	97	98	99	1,131
948 Mechanical, Electrical & Electronics Assemblers	273	337	204	297	130	185	149	258	223	225	231	237	243	2,991
949 Other Assembly & Related Occ's	-439	609	182	313	179	408	114	465	252	315	318	321	323	3,359
951 Machining / MetalworkingWoodworking Operators	940	543	753	793	559	405	393	474	457	490	495	499	504	7,316
961 Processing / Manufacturing / Utilities Labourers	124	464	913	695	-106	1,113	409	417	546	557	561	566	570	6,828
All	70,152	85,038	82,285	85,211	62,103	61,856	63,533	65,506	66,056	66,775	67,507	68,252	69,011	913,285

Table D-1 Incremental Employment Demand from 2010 Games by Occupation, 2003 to 2015

Table D-1

Incremental Employment Demand from 2010 Games by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	Self-Employed
001 Legislators & Senior Management	1	1	6	16	17	39	59	129	21	16	16	13	10	344	90
011 Administrative Services Managers	1	2	9	22	25	51	81	168	26	19	19	16	13	451	20
012 Managers in Financial / Business Services	1	1	7	16	18	36	57	117	18	14	13	11	9	319	30
013 Managers in Communication (Except Broadcasting)	0	1	3	8	9	14	23	33	3	2	2	2	2	102	5
021 Engineering / Science / Information Systems Mgr's	1	1	6	15	16	25	42	64	7	5	5	4	3	195	24
031 Health / Education / Social & Community Services Mgr's	0	0	1	2	1	5	7	25	5	4	4	3	2	60	4
041 Managers in Public Administration	0	0	0	1	1	2	3	7	1	1	1	1	1	18	0
051 Art / Culture / Recreation / Sport Managers	0	0	1	3	3	14	21	62	13	10	9	8	6	152	30
061 Sales, Marketing & Advertising Managers	1	2	10	21	23	55	82	198	34	26	25	21	17	514	108
062 Managers in Retail Trade	1	2	10	25	27	124	185	586	116	87	85	71	56	1,377	494
063 Managers in Food Service & Accommodation	2	3	16	40	45	357	523	1,781	397	298	289	241	193	4,185	1,590
064 Managers in Protective Service	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0
065 Managers in Other Services	0	0	1	2	2	10	15	45	9	7	6	5	4	107	41
071 Managers in Construction & Transportation	1	2	8	20	21	47	76	178	22	16	16	13	11	429	196
072 Facility Operation & Maintenance Managers	0	0	2	5	6	26	39	122	25	19	18	15	12	291	35
081 Primary Production Managers	0	0	0	1	1	1	2	3	0	0	0	0	0	9	3
091 Managers in Manufacturing & Utilities	2	3	14	37	39	58	99	134	10	7	7	6	5	420	96
111 Auditors / Accountants / Investment Professionals	5	8	45	112	122	214	353	610	79	59	58	48	38	1,751	392
112 Human Resources & Business Service Professionals	1	2	11	29	31	53	88	153	20	15	14	12	10	439	140
121 Clerical Supervisors	1	2	11	28	31	60	109	216	33	25	24	20	16	579	8
122 Administrative & Regulatory Occ's	2	4	20	52	55	116	177	364	55	41	40	34	27	988	140
123 Finance & Insurance Administrative Occ's	2	3	16	38	41	93	147	328	53	40	39	32	26	858	195
124 Secretaries, Recorders & Transcriptionists	3	5	27	70	72	120	181	293	33	25	24	20	16	891	90
141 Clerical Occ's, General Office Skills	2	3	17	41	45	95	151	312	48	36	35	29	23	837	30
142 Office Equipment Operators	1	1	8	19	20	40	63	125	19	14	14	12	9	345	14
143 Finance & Insurance Clerks	3	5	28	68	73	151	239	482	74	55	54	45	36	1,311	42
144 Administrative Support Clerks	1	2	10	25	27	58	92	196	32	24	23	19	15	525	19
145 Library, Correspondence & Related Info. Clerks	1	2	11	27	29	57	90	178	27	20	19	16	13	489	7
146 Mail & Message Distribution Occ's	2	3	16	39	42	69	113	176	20	15	15	12	10	531	35
147 Recording / Scheduling / Distributing Occ's	2	4	20	48	52	112	177	388	60	45	44	37	29	1,018	24
211 Physical Science Professionals	0	0	3	6	7	11	17	25	2	2	2	2	1	78	14
212 Life Science Professionals	0	1	3	7	7	11	18	25	2	2	2	1	1	79	15
213 Civil / Mechanical / Electrical / Chemical Engineers	2	3	16	39	42	64	107	155	15	11	11	9	7	481	79
214 Other Engineers	1	2	12	29	32	48	81	112	9	7	7	6	5	351	41
215 Architects / Urban Planners / Land Surveyors	1	1	7	17	18	26	42	56	4	3	3	3	2	183	64
216 Mathematicians / Analysts / Programmers	4	7	35	88	99	157	269	427	50	38	37	30	24	1,265	251
221 Technical Occ's in Physical Sciences	0	1	3	7	8	13	21	33	3	3	3	2	2	100	8
222 Technical Occ's in Life Sciences	0	1	4	9	10	38	56	160	33	25	24	20	16	395	50
223 Civil / Mechanical / Industrial Engineering Technicians	1	1	6	15	17	25	42	61	5	4	4	3	2	187	28
224 Electronics / Electrical Engineering Technicians	2	2	13	31	34	65	105	203	28	21	21	17	14	555	74
225 Tech. Occ's in Architecture / Drafting / etc.	1	2	11	25	27	39	66	90	7	5	5	4	3	286	49
226 Other Technical Inspectors / Regulatory Officers	0	0	2	5	6	12	20	42	6	4	4	4	3	109	11
227 Transportation Officers & Controllers	0	0	1	2	2	14	20	69	13	10	10	8	6	156	10
311 Physicians / Dentists / Veterinarians	0	0	0	1	1	3	5	12	2	2	2	1	1	30	20
312 Optometrists / Chiropractors / Other Health Professions	0	0	0	0	0	1	1	2	0	0	0	0	0	5	5
313 Pharmacists, Dietitians & Nutritionists	0	0	0	1	1	7	10	31	6	5	5	4	3	73	7
314 Therapy & Assessment Professionals	0	0	0	0	1	1	2	5	1	1	1	1	0	13	3
315 Nurse Supervisors & Registered Nurses	0	0	1	3	3	9	15	36	7	5	5	4	3	92	1
321 Medical Technologists / Technicians	0	0	1	2	3	5	9	15	2	2	2	1	1	42	1
322 Tech. Occ's in Dental Health Care	0	0	2	5	5	7	12	15	1	0	0	0	0	49	8

323 Other Tech. Occ's in Health (Except Dental)	0	0	1	2	3	8	12	32	6	4	4	4	3	79	15
341 Assisting Occ's in Health Services	0	0	2	4	4	10	16	35	6	4	4	4	3	93	1
411 Judges / Lawyers / Notaries	2	4	19	46	49	71	120	156	12	9	9	7	6	511	257
412 University Professors & Assistants	0	0	0	1	1	2	3	8	2	1	1	1	1	21	2
413 College & Other Voc. Instructors	0	0	2	6	6	20	32	86	16	12	12	10	8	212	48
414 Secondary / Elementary School Teachers & Counsellors	0	0	1	3	3	10	15	37	7	5	5	4	3	93	0
415 Psychologists / Social Workers / Clergy	0	0	2	4	5	13	21	52	10	7	7	6	5	133	10
416 Policy & Program Officers	1	1	7	17	18	38	62	123	19	14	14	12	9	335	0
421 Paralegals / Social Services Workers / etc.	1	2	11	26	28	54	87	164	24	18	18	15	12	461	96
511 Librarians, Archivists, Conservators & Curators	0	0	0	1	1	2	3	8	2	1	1	1	1	20	0
512 Writing / Translating / Public Relations Professionals	1	2	8	20	21	51	81	184	33	24	24	20	16	484	180
513 Creative & Performing Artists	1	1	7	17	19	110	162	521	113	85	82	69	55	1,242	730
521 Technical Occ's: Libraries / Archives / etc.	0	0	0	0	0	1	2	3	1	0	0	0	0	9	0
522 Photographers / Graphic Arts Technicians / etc.	1	1	5	13	14	56	85	245	50	38	36	30	24	599	212
523 Announcers & Other Performers	0	0	1	3	3	13	20	66	13	9	9	8	6	145	31
524 Creative Designers & Craftspersons	2	3	18	45	49	81	134	215	25	19	18	15	12	639	307
525 Athletes, Coaches, Referees & Related Occ's	1	1	6	14	16	126	185	646	143	107	104	87	69	1,498	237
621 Sales & Service Supervisors	1	2	10	26	28	182	267	879	191	143	139	116	92	2,075	126
622 Technical Sales Specialists, Wholesale Trade	1	2	9	23	25	51	81	170	26	19	19	15	12	453	35
623 Insurance & Real Estate Sales Occ's	1	2	10	24	26	62	97	218	37	28	27	22	18	574	99
624 Chefs & Cooks	2	4	20	48	53	430	631	2,154	481	360	350	292	233	5,059	223
625 Butchers & Bakers	0	0	2	5	6	38	57	190	41	31	30	25	20	444	30
626 Police Officers & Firefighters	0	0	1	2	2	7	11	31	6	5	5	4	3	76	0
627 Technical Occ's in Personal Service	0	0	2	4	4	14	22	58	11	8	8	7	5	144	54
641 Sales Rep's, Wholesale Trade	2	3	17	42	44	98	156	325	50	38	37	31	24	868	127
642 Retail Salespersons & Sales Clerks	2	3	16	39	42	198	294	931	187	140	136	113	91	2,191	144
643 Occ's in Travel & Accommodation	1	1	5	12	13	85	124	412	88	66	64	54	43	969	38
644 Tour & Rec. Guides & Amuse. Occ's	0	0	0	1	1	7	10	34	8	6	6	5	4	81	15
645 Occ's in Food & Beverage Service	3	5	27	64	70	559	801	2,731	610	457	444	370	296	6,438	81
646 Other Occ's in Protective Service	0	0	1	2	2	6	10	23	4	3	3	3	2	60	1
647 Childcare & Home Support Workers	0	1	3	8	8	26	39	102	19	14	14	12	9	254	27
648 Other Occ's in Personal Service	0	0	1	3	4	15	22	63	12	9	9	7	6	152	56
661 Cashiers	2	2	13	31	33	215	314	1,009	217	162	158	131	105	2,392	28
662 Other Sales & Related Occ's	1	2	9	23	25	87	130	368	70	53	51	43	34	897	75
663 Elemental Med. & Hospital Assistants	0	0	0	0	0	0	1	1	0	0	0	0	0	4	0
664 Food Counter Attendants & Helpers	3	4	20	51	52	432	613	2,014	449	337	327	272	218	4,792	69
665 Security Guards & Related Occ's	1	1	7	17	19	42	65	138	23	17	17	14	11	373	5
666 Cleaners	2	3	17	43	45	212	317	942	196	147	143	119	95	2,283	351
667 Travel / Accommodation / Recreation Attendants	0	1	3	8	9	73	108	349	78	58	57	47	38	829	21
668 Other Elemental Service Occ's	0	1	4	7	9	30	42	129	24	18	17	15	12	298	21
721 Contractors & Supervisors, Trades & Related	1	2	11	28	30	69	111	263	37	28	27	22	18	647	170
722 Supervisors- Railway & Motor Trans.	0	0	1	3	4	20	29	101	20	15	14	12	9	228	25
723 Machinists & Related Occ's	0	0	2	5	5	10	15	27	4	3	3	2	2	77	8
724 Electrical Trades & Telecommunications Occ's	1	2	12	29	31	53	88	154	15	11	11	9	7	424	43
725 Plumbers, Pipefitters & Gas Fitters	0	1	3	9	10	18	30	59	5	4	4	3	3	148	30
726 Metal Forming / Shaping / Erecting Occ's	0	0	2	5	5	9	15	28	2	2	2	1	1	72	7
727 Carpenters & Cabinetmakers	2	3	13	34	36	59	100	172	13	10	10	8	6	466	157
728 Masonry & Plastering Trades	0	1	4	10	10	18	31	59	4	3	3	3	2	148	61
729 Other Construction Trades	1	1	5	13	14	26	44	88	8	6	6	5	4	221	82
731 Machinery / Transportation Equipment Mechanics	1	2	10	25	27	56	91	198	27	20	20	16	13	507	33

732 Motor Vehicle Mechanics	1	1	4	11	12	59	87	285	57	43	41	34	28	662	111
733 Other Mechanics	0	0	1	2	3	9	14	40	7	5	5	4	4	96	29
734 Upholsterers / Tailors / Shoe Repairers / etc	1	1	5	13	14	23	38	65	8	6	6	5	4	187	64
735 Stationary Engineers / Power System Operators	0	0	1	2	2	6	10	26	5	4	4	3	2	65	2
736 Train Crew Operating Occ's	0	0	0	1	1	6	9	32	6	5	5	4	3	72	0
737 Crane Operators, Drillers & Blasters	0	0	1	1	2	4	6	13	2	1	1	1	1	32	2
738 Printing Press Operators / Commercial Divers / etc	0	1	3	9	9	21	32	67	11	8	8	7	5	182	29
741 Motor Vehicle & Transit Drivers	3	5	25	63	66	266	397	1,234	233	175	170	141	113	2,888	511
742 Heavy Equipment Operators	0	1	4	9	10	23	37	92	12	9	9	8	6	221	27
743 Other Transport Equipment Operators	0	0	1	2	2	14	20	69	14	10	10	8	7	156	7
744 Other Installers / Repairers / Servicers	0	1	4	9	10	25	40	101	16	12	12	10	8	249	60
745 Longshore Workers & Material Handlers	1	2	10	24	27	66	104	255	43	32	31	26	21	642	8
761 Trades Helpers & Labourers	1	1	6	16	17	31	51	100	10	7	7	6	5	257	27
762 Public Works & Other Labourers	0	0	1	1	1	6	9	26	5	4	4	3	2	63	3
821 Supervisors, Logging & Forestry	0	0	1	2	2	2	4	5	0	0	0	0	0	17	3
822 Supervisors, Mining / Oil / Gas	0	0	1	2	2	3	6	8	1	0	0	0	0	24	2
823 Underground Miners / Oil & Gas Drillers / etc	0	0	1	2	2	4	7	12	1	1	1	1	0	30	2
824 Logging Machinery Operators	0	0	1	2	2	3	5	7	0	0	0	0	0	21	2
825 Contractors / Operators / Supervisors: Agriculture	0	1	3	7	8	36	53	171	33	25	24	20	16	397	244
826 Fishing Vessel Masters & Skippers	0	0	0	0	0	1	2	7	1	1	1	1	1	17	7
841 Mine Service Workers & Operators in Oil	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0
842 Logging & Forestry Workers	0	0	1	3	3	5	8	11	1	1	1	1	0	35	6
843 Agriculture & Horticulture Workers	0	0	1	3	3	15	22	76	16	12	11	9	8	176	27
844 Other Fishing & Trapping Occ's	0	0	0	0	0	0	1	2	0	0	0	0	0	5	1
861 Primary Production Labourers	0	1	3	8	8	33	50	146	29	22	21	18	14	351	60
921 Supervisors, Processing Occ's	1	1	5	13	13	22	38	64	7	5	5	4	4	181	7
922 Supervisors, Assembly & Fabrication	1	2	12	30	34	45	76	96	4	3	3	2	2	309	27
923 Central Control Operators: Manufacturing / Processing	0	0	0	1	1	2	3	7	1	1	1	1	0	18	0
941 Machine Operators: Metal & Mineral Products	0	0	1	3	3	6	9	17	1	1	1	1	1	44	4
942 Machine Operators: Chemical / Plastic / Rubber	0	0	2	6	7	12	19	35	4	3	3	3	2	98	4
943 Machine Operators: Pulp & Paper Prod	0	1	4	9	10	15	24	35	3	2	2	2	1	108	4
944 Machine Operators: Textile Processing	2	3	15	39	42	55	95	109	3	2	2	2	1	370	45
945 Machine Operators: Fabric / Fur / Leather	6	9	48	119	127	166	281	319	8	6	6	5	4	1,105	102
946 Machine Operators: Food / Beverage / Tobacco	0	0	1	2	3	18	26	94	19	14	14	12	9	213	6
947 Printing Machine Operators & Related Occ's	0	0	3	6	7	15	24	55	9	7	7	6	4	144	10
948 Mechanical, Electrical & Electronics Assemblers	1	1	5	12	13	19	32	42	3	2	2	2	1	135	7
949 Other Assembly & Related Occ's	4	6	30	73	79	108	183	222	9	7	7	6	4	736	110
951 Machining / MetalworkingWoodworking Operators	2	3	16	39	42	65	108	161	13	10	10	8	6	483	29
961 Processing / Manufacturing / Utilities Labourers	3	4	23	56	60	96	158	245	24	18	17	14	12	731	16
All	130	200	1,048	2,591	2,801	7,842	12,106	30,382	5,524	4,139	4,021	3,349	2,681	76,813	10,614

Table D-2 Incremental Employment Demand from VCEC Expansion by Occupation, 2003 to 2015

Table D-2

Incremental Employment Demand from VCEC Expansion by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	Self-Employed
001 Legislators & Senior Management	1	5	24	34	7	7	9	11	13	14	15	17	17	176	46
011 Administrative Services Managers	1	5	17	21	5	9	12	14	17	18	20	21	22	181	8
012 Managers in Financial / Business Services	1	3	12	15	3	8	10	12	14	15	17	18	18	146	14
013 Managers in Communication (Except Broadcasting)	0	0	1	2	0	1	1	1	2	2	2	2	2	17	1
021 Engineering / Science / Information Systems Mgr's	1	3	10	12	3	4	5	6	7	8	9	10	10	87	11
031 Health / Education / Social & Community Services Mgr's	0	0	1	2	0	1	1	2	2	3	3	3	3	22	1
041 Managers in Public Administration	0	0	1	1	0	0	1	1	1	1	1	1	1	9	0
051 Art / Culture / Recreation / Sport Managers	0	0	1	1	0	3	4	4	5	6	6	7	7	42	8
061 Sales, Marketing & Advertising Managers	1	5	18	21	5	10	14	17	19	21	23	25	25	203	43
062 Managers in Retail Trade	2	8	28	36	8	20	27	33	38	41	45	49	49	383	137
063 Managers in Food Service & Accommodation	1	3	9	12	3	90	122	149	173	188	204	222	224	1,399	532
064 Managers in Protective Service	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
065 Managers in Other Services	0	1	3	4	1	3	4	5	6	6	7	7	7	55	21
071 Managers in Construction & Transportation	8	41	141	181	40	7	9	11	13	14	15	16	16	510	233
072 Facility Operation & Maintenance Managers	0	1	3	4	1	6	9	11	12	13	15	16	16	107	13
081 Primary Production Managers	0	0	1	1	0	0	0	0	0	0	0	0	0	4	1
091 Managers in Manufacturing & Utilities	1	3	12	16	4	3	5	5	6	7	7	8	8	86	20
111 Auditors / Accountants / Investment Professionals	4	19	69	90	20	40	55	67	78	85	92	100	101	819	183
112 Human Resources & Business Service Professionals	1	5	17	22	5	10	13	16	19	21	23	25	25	202	64
121 Clerical Supervisors	1	5	18	23	5	10	16	18	21	22	24	26	27	216	3
122 Administrative & Regulatory Occ's	3	13	46	60	13	21	26	32	37	40	43	47	47	427	60
123 Finance & Insurance Administrative Occ's	3	13	45	57	13	19	25	30	35	38	41	45	45	410	93
124 Secretaries, Recorders & Transcriptionists	3	16	60	79	17	21	26	31	36	39	42	46	46	462	47
141 Clerical Occ's, General Office Skills	2	10	34	43	10	17	23	28	32	35	38	42	42	357	13
142 Office Equipment Operators	1	3	12	15	3	6	9	10	12	13	14	15	15	129	5
143 Finance & Insurance Clerks	3	15	52	68	15	28	37	44	50	55	59	64	65	555	18
144 Administrative Support Clerks	1	6	19	25	5	11	14	17	20	22	24	26	26	217	8
145 Library, Correspondence & Related Info. Clerks	1	4	13	17	4	8	11	13	15	16	18	19	19	159	2
146 Mail & Message Distribution Occ's	0	2	8	10	2	5	6	8	9	10	10	11	11	93	6
147 Recording / Scheduling / Distributing Occ's	2	8	29	38	8	18	24	28	33	36	39	42	43	347	8
211 Physical Science Professionals	0	1	4	5	1	2	2	3	3	4	4	4	4	38	7
212 Life Science Professionals	0	1	4	5	1	2	2	3	3	4	4	4	4	40	8
213 Civil / Mechanical / Electrical / Chemical Engineers	2	9	31	39	9	10	14	17	20	21	23	25	25	244	40
214 Other Engineers	1	5	17	22	5	8	10	12	15	16	17	19	19	165	19
215 Architects / Urban Planners / Land Surveyors	1	4	13	16	3	5	6	7	8	9	10	11	11	103	36
216 Mathematicians / Analysts / Programmers	3	15	51	67	15	26	37	44	52	56	61	66	67	559	111
221 Technical Occ's in Physical Sciences	0	1	5	6	1	2	3	3	4	4	5	5	5	44	4
222 Technical Occ's in Life Sciences	0	2	6	7	2	9	11	14	16	18	19	21	21	145	18
223 Civil / Mechanical / Industrial Engineering Technicians	1	6	20	25	5	3	5	6	7	7	8	9	9	111	17
224 Electronics / Electrical Engineering Technicians	1	7	24	32	7	10	13	16	19	20	22	24	24	220	29
225 Tech. Occ's in Architecture / Drafting / etc.	1	5	18	23	5	6	8	10	12	13	14	15	15	144	25
226 Other Technical Inspectors / Regulatory Officers	0	2	8	10	2	3	4	5	5	6	6	7	7	65	6
227 Transportation Officers & Controllers	0	1	2	3	0	5	7	8	9	10	11	12	12	80	5
311 Physicians / Dentists / Veterinarians	0	0	1	1	0	1	1	1	1	1	1	1	1	11	7
312 Optometrists / Chiropractors / Other Health Professions	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
313 Pharmacists, Dietitians & Nutritionists	0	0	1	2	0	1	1	2	2	2	2	2	2	18	2
314 Therapy & Assessment Professionals	0	0	1	1	0	0	1	0	1	1	1	1	1	6	2
315 Nurse Supervisors & Registered Nurses	0	1	3	4	1	2	2	3	3	3	4	4	4	34	0
321 Medical Technologists / Technicians	0	0	2	2	1	1	1	1	1	1	2	2	2	16	0
322 Tech. Occ's in Dental Health Care	0	1	2	2	1	0	1	1	1	1	1	1	1	12	2

Table D-2

Incremental Employment Demand from VCEC Expansion by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	Self-Employed
323 Other Tech. Occ's in Health (Except Dental)	0	1	2	3	1	1	2	2	3	3	3	4	4	29	6
341 Assisting Occ's in Health Services	0	1	4	5	1	2	2	3	3	4	4	4	4	37	0
411 Judges / Lawyers / Notaries	2	8	28	36	8	13	17	21	24	26	28	31	31	274	138
412 University Professors & Assistants	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
413 College & Other Voc. Instructors	0	1	3	4	1	5	7	8	9	10	11	12	12	82	19
414 Secondary / Elementary School Teachers & Counsellors	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
415 Psychologists / Social Workers / Clergy	0	1	4	6	1	4	5	6	7	8	8	9	9	69	5
416 Policy & Program Officers	1	3	12	15	4	8	11	13	15	16	18	19	19	153	0
421 Paralegals / Social Services Workers / etc.	1	5	16	21	5	11	15	18	21	23	24	27	27	212	44
511 Librarians, Archivists, Conservators & Curators	0	0	0	0	0	0	1	1	1	1	1	1	1	7	0
512 Writing / Translating / Public Relations Professionals	0	2	8	11	2	9	12	14	17	18	20	21	21	156	58
513 Creative & Performing Artists	0	1	4	6	1	26	36	43	50	55	59	65	65	413	242
521 Technical Occ's: Libraries / Archives / etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
522 Photographers / Graphic Arts Technicians / etc.	0	1	5	6	1	12	16	20	23	25	27	30	30	198	70
523 Announcers & Other Performers	0	0	1	1	0	3	4	5	6	6	7	7	7	46	10
524 Creative Designers & Craftspersons	1	7	23	29	7	11	15	18	21	23	25	27	27	232	112
525 Athletes, Coaches, Referees & Related Occ's	0	1	4	5	1	32	44	54	63	69	74	81	81	509	80
621 Sales & Service Supervisors	1	5	17	22	5	43	58	69	81	88	95	104	105	692	42
622 Technical Sales Specialists, Wholesale Trade	1	6	22	28	6	8	12	14	16	17	19	21	21	191	15
623 Insurance & Real Estate Sales Occ's	1	6	20	25	6	13	18	21	24	27	29	31	32	252	44
624 Chefs & Cooks	1	3	10	14	3	108	148	179	208	227	245	267	269	1,683	74
625 Butchers & Bakers	0	1	3	4	1	8	11	13	15	16	18	19	20	129	9
626 Police Officers & Firefighters	0	1	4	5	1	2	3	3	4	4	4	5	5	40	0
627 Technical Occ's in Personal Service	1	3	11	14	3	16	22	26	30	33	35	38	39	269	101
641 Sales Rep's, Wholesale Trade	2	8	28	36	8	15	21	25	29	31	34	37	37	309	45
642 Retail Salespersons & Sales Clerks	2	12	41	52	12	33	44	53	62	67	73	79	80	610	40
643 Occ's in Travel & Accommodation	0	2	5	7	2	24	32	39	45	49	53	58	58	375	15
644 Tour & Rec. Guides & Amuse. Occ's	0	0	0	0	0	2	2	3	3	4	4	4	5	29	5
645 Occ's in Food & Beverage Service	1	4	14	17	4	141	188	227	265	288	312	340	342	2,142	27
646 Other Occ's in Protective Service	0	1	2	3	1	1	2	2	3	3	3	3	3	28	1
647 Childcare & Home Support Workers	1	4	14	17	4	18	24	29	33	36	39	43	43	307	32
648 Other Occ's in Personal Service	0	1	4	6	1	7	9	11	12	14	15	16	16	112	41
661 Cashiers	1	6	20	26	6	46	62	71	84	91	99	108	109	729	9
662 Other Sales & Related Occ's	1	6	20	26	6	14	19	22	26	28	31	33	34	267	22
663 Elemental Med. & Hospital Assistants	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
664 Food Counter Attendants & Helpers	1	3	12	17	3	110	145	170	198	216	233	254	256	1,618	23
665 Security Guards & Related Occ's	1	3	11	15	3	9	12	14	16	17	19	20	21	160	2
666 Cleaners	3	15	50	63	14	55	74	88	102	111	120	131	131	957	147
667 Travel / Accommodation / Recreation Attendants	0	1	2	2	1	19	25	29	34	37	40	44	44	278	7
668 Other Elemental Service Occ's	0	2	6	7	2	8	11	13	15	16	17	19	19	135	10
721 Contractors & Supervisors, Trades & Related	9	45	156	200	44	8	10	13	15	16	18	19	19	572	150
722 Supervisors- Railway & Motor Trans	0	1	2	3	1	7	10	12	14	15	16	18	18	116	13
723 Machinists & Related Occ's	0	1	2	3	1	1	1	1	1	2	2	2	2	18	2
724 Electrical Trades & Telecommunications Occ's	5	27	95	122	27	4	5	6	7	8	8	9	9	333	34
725 Plumbers, Pipefitters & Gas Fitters	4	18	62	80	18	1	2	2	3	3	3	3	3	202	41
726 Metal Forming / Shaping / Erecting Occ's	2	9	32	41	9	0	1	1	1	1	1	1	1	100	9
727 Carpenters & Cabinetmakers	8	40	138	175	39	4	5	7	8	8	9	10	10	462	155
728 Masonry & Plastering Trades	4	22	78	101	22	1	1	1	2	2	2	2	2	242	99
729 Other Construction Trades	6	29	100	129	29	2	2	3	3	3	4	4	4	319	118
731 Machinery / Transportation Equipment Mechanics	3	15	52	67	15	9	12	15	17	19	20	22	22	289	19

Table D-2

Incremental Employment Demand from VCEC Expansion by Occupation, 2003 to 2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total	Self-Employed
732 Motor Vehicle Mechanics	1	4	12	16	4	11	15	18	21	23	25	27	27	204	34
733 Other Mechanics	1	3	9	12	3	2	3	3	4	4	4	5	5	54	16
734 Upholsterers / Tailors / Shoe Repairers / etc.	0	2	7	9	2	4	5	6	7	8	8	9	9	75	26
735 Stationary Engineers / Power System Operators	0	1	2	3	1	1	1	2	2	2	2	3	3	23	1
736 Train Crew Operating Occ's	0	0	1	1	0	2	3	4	4	5	5	6	6	37	0
737 Crane Operators, Drillers & Blasters	0	2	7	10	2	1	1	1	1	1	1	1	1	28	2
738 Printing Press Operators / Commercial Divers / etc.	0	0	1	1	0	1	1	1	1	1	1	2	2	13	2
741 Motor Vehicle & Transit Drivers	3	15	52	68	15	80	108	129	151	164	177	193	195	1,350	239
742 Heavy Equipment Operators	3	15	52	65	15	4	6	7	8	9	9	10	10	213	26
743 Other Transport Equipment Operators	0	0	1	1	0	5	7	8	9	10	11	12	12	79	3
744 Other Installers / Repairers / Servicers	2	10	36	46	10	4	5	6	7	8	8	9	9	160	38
745 Longshore Workers & Material Handlers	1	6	21	27	6	13	17	21	24	27	29	31	32	254	3
761 Trades Helpers & Labourers	6	30	104	131	29	3	4	5	5	6	6	7	7	342	36
762 Public Works & Other Labourers	0	1	3	3	1	2	3	3	3	4	4	4	4	34	2
821 Supervisors, Logging & Forestry	0	0	1	1	0	0	0	0	0	0	0	0	0	4	1
822 Supervisors, Mining / Oil / Gas	0	1	2	3	1	1	1	1	1	1	1	1	1	14	1
823 Underground Miners / Oil & Gas Drillers / etc.	0	1	3	4	1	1	1	1	1	2	2	2	2	19	1
824 Logging Machinery Operators	0	0	1	1	0	0	0	0	0	0	0	0	0	5	1
825 Contractors / Operators / Supervisors: Agriculture	1	6	22	28	6	10	13	16	19	21	23	25	25	215	132
826 Fishing Vessel Masters & Skippers	0	0	0	0	0	0	0	1	1	1	1	1	1	6	3
841 Mine Service Workers & Operators in Oil	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
842 Logging & Forestry Workers	0	0	1	2	0	0	0	0	1	1	1	1	1	9	1
843 Agriculture & Horticulture Workers	0	1	3	3	1	4	6	7	8	9	10	11	11	74	11
844 Other Fishing & Trapping Occ's	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
861 Primary Production Labourers	1	5	18	23	5	8	10	13	15	16	17	19	19	168	29
921 Supervisors, Processing Occ's	0	1	4	5	1	1	2	2	2	2	2	3	3	28	1
922 Supervisors, Assembly & Fabrication	1	3	11	14	3	3	4	5	5	6	6	7	7	75	6
923 Central Control Operators: Manufacturing / Processing	0	0	1	1	0	0	0	0	0	0	0	0	0	4	0
941 Machine Operators: Metal & Mineral Products	0	0	1	2	0	0	0	0	0	0	0	0	0	7	1
942 Machine Operators: Chemical / Plastic / Rubber	0	0	2	2	0	1	1	1	1	1	1	1	1	13	1
943 Machine Operators: Pulp & Paper Prod	0	0	1	1	0	0	0	0	0	0	0	0	0	3	0
944 Machine Operators: Textile Processing	1	4	13	17	4	3	5	6	6	7	8	8	8	91	11
945 Machine Operators: Fabric / Fur / Leather	2	12	41	53	12	10	14	16	19	21	23	25	25	273	25
946 Machine Operators: Food / Beverage / Tobacco	0	0	0	0	0	0	0	0	1	1	1	1	1	5	0
947 Printing Machine Operators & Related Occ's	0	0	1	2	0	1	1	1	2	2	2	2	2	16	1
948 Mechanical, Electrical & Electronics Assemblers	0	1	4	6	1	1	2	2	2	2	3	3	3	30	2
949 Other Assembly & Related Occ's	1	7	26	34	7	7	9	11	12	14	15	16	16	175	26
951 Machining / MetalworkingWoodworking Operators	2	8	28	36	8	6	8	9	11	11	12	14	14	164	10
961 Processing / Manufacturing / Utilities Labourers	1	5	19	24	5	5	7	8	9	10	11	12	12	128	3
All	147	736	2,575	3,311	736	1,548	2,086	2,500	2,914	3,173	3,431	3,738	3,765	30,660	4,771

Table D-3 Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Occupation, 2003 to 2009

Table D-3

Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Occupation, 2003 to 2009

	2003	2004	2005	2006	2007	2008	2009	Total	Self-Employed
001 Legislators & Senior Management	1	4	23	25	25	15	4	97	25
011 Administrative Services Managers	0	3	12	12	12	8	3	52	2
012 Managers in Financial / Business Services	0	2	8	8	8	5	2	35	3
013 Managers in Communication (Except Broadcasting)	0	0	1	1	1	1	0	4	0
021 Engineering / Science / Information Systems Mgr's	0	2	6	6	6	4	2	25	3
031 Health / Education / Social & Community Services Mgr's	0	0	1	1	1	1	0	5	0
041 Managers in Public Administration	0	0	0	0	0	0	0	2	0
051 Art / Culture / Recreation / Sport Managers	0	0	1	1	1	0	0	2	0
061 Sales, Marketing & Advertising Managers	0	3	12	12	12	8	3	50	10
062 Managers in Retail Trade	1	6	22	22	22	14	5	92	33
063 Managers in Food Service & Accommodation	0	2	7	7	7	5	2	30	11
064 Managers in Protective Service	0	0	0	0	0	0	0	0	0
065 Managers in Other Services	0	1	3	3	3	2	1	12	5
071 Managers in Construction & Transportation	7	41	148	148	148	98	37	627	286
072 Facility Operation & Maintenance Managers	0	1	2	2	2	2	1	10	1
081 Primary Production Managers	0	0	1	1	1	1	0	4	1
091 Managers in Manufacturing & Utilities	0	1	5	5	5	4	1	22	5
111 Auditors / Accountants / Investment Professionals	2	10	38	38	39	26	10	164	37
112 Human Resources & Business Service Professionals	0	3	10	10	10	7	3	43	14
121 Clerical Supervisors	1	3	13	14	14	9	4	58	1
122 Administrative & Regulatory Occ's	1	10	36	36	35	24	9	151	21
123 Finance & Insurance Administrative Occ's	2	11	38	37	37	25	9	159	36
124 Secretaries, Recorders & Transcriptionists	2	12	43	44	43	29	11	184	19
141 Clerical Occ's, General Office Skills	1	7	25	25	25	17	6	106	4
142 Office Equipment Operators	0	3	9	9	9	6	2	39	2
143 Finance & Insurance Clerks	2	11	39	39	39	26	10	165	5
144 Administrative Support Clerks	1	4	13	13	13	9	3	55	2
145 Library, Correspondence & Related Info. Clerks	0	3	9	9	9	6	2	38	1
146 Mail & Message Distribution Occ's	0	2	6	6	6	4	2	27	2
147 Recording / Scheduling / Distributing Occ's	1	6	21	21	21	14	5	89	2
211 Physical Science Professionals	0	1	3	3	3	2	1	14	2
212 Life Science Professionals	0	1	2	2	2	1	0	8	2
213 Civil / Mechanical / Electrical / Chemical Engineers	1	6	21	21	22	16	6	93	15
214 Other Engineers	0	3	11	11	11	8	3	47	6
215 Architects / Urban Planners / Land Surveyors	0	2	7	7	7	5	2	31	11
216 Mathematicians / Analysts / Programmers	1	8	28	28	29	19	7	120	24
221 Technical Occ's in Physical Sciences	0	1	4	4	4	3	1	19	2
222 Technical Occ's in Life Sciences	0	1	4	4	4	3	1	18	2
223 Civil / Mechanical / Industrial Engineering Technicians	1	5	18	17	17	11	4	73	11
224 Electronics / Electrical Engineering Technicians	1	5	19	20	21	14	6	86	12
225 Tech. Occ's in Architecture / Drafting / etc.	0	3	11	11	12	8	3	49	8
226 Other Technical Inspectors / Regulatory Officers	0	2	7	7	8	5	2	32	3
227 Transportation Officers & Controllers	0	1	1	2	2	2	0	8	1
311 Physicians / Dentists / Veterinarians	0	0	1	1	1	1	0	3	2
312 Optometrists / Chiropractors / Other Health Professions	0	0	0	0	0	0	0	0	0
313 Pharmacists, Dietitians & Nutritionists	0	0	1	1	1	1	0	4	0
314 Therapy & Assessment Professionals	0	0	0	0	0	0	0	2	0
315 Nurse Supervisors & Registered Nurses	0	1	3	2	2	2	1	10	0
321 Medical Technologists / Technicians	0	0	1	1	1	1	0	4	0
322 Tech. Occ's in Dental Health Care	0	0	0	0	0	0	0	1	0

Table D-3

Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Occupation, 2003 to 2009

	2003	2004	2005	2006	2007	2008	2009	Total	Self-Employed
323 Other Tech. Occ's in Health (Except Dental)	0	0	2	2	2	1	0	8	2
341 Assisting Occ's in Health Services	0	1	2	3	2	2	1	11	0
411 Judges / Lawyers / Notaries	1	4	13	13	13	9	3	55	28
412 University Professors & Assistants	0	0	1	1	1	1	0	3	0
413 College & Other Voc. Instructors	0	1	2	2	2	2	1	10	2
414 Secondary / Elementary School Teachers & Counsellors	0	1	3	3	3	2	1	14	0
415 Psychologists / Social Workers / Clergy	0	1	4	4	4	3	1	16	1
416 Policy & Program Officers	0	2	7	7	8	5	2	31	0
421 Paralegals / Social Services Workers / etc.	0	2	9	9	9	6	2	37	8
511 Librarians, Archivists, Conservators & Curators	0	0	0	0	0	0	0	1	0
512 Writing / Translating / Public Relations Professionals	0	2	6	6	6	4	1	24	9
513 Creative & Performing Artists	0	1	4	4	4	3	1	16	10
521 Technical Occ's: Libraries / Archives / etc.	0	0	0	0	0	0	0	1	0
522 Photographers / Graphic Arts Technicians / etc.	0	1	3	3	3	2	1	13	5
523 Announcers & Other Performers	0	0	1	1	1	0	0	2	0
524 Creative Designers & Craftspersons	0	3	10	10	10	7	3	42	20
525 Athletes, Coaches, Referees & Related Occ's	0	1	2	2	3	2	1	11	2
621 Sales & Service Supervisors	1	4	14	13	14	9	3	57	3
622 Technical Sales Specialists, Wholesale Trade	1	5	19	19	18	12	5	78	6
623 Insurance & Real Estate Sales Occ's	1	4	15	15	15	10	4	64	11
624 Chefs & Cooks	0	2	8	8	8	5	2	35	2
625 Butchers & Bakers	0	1	3	3	3	2	1	11	1
626 Police Officers & Firefighters	0	0	1	1	1	1	0	5	0
627 Technical Occ's in Personal Service	0	1	4	4	4	2	1	15	6
641 Sales Rep's, Wholesale Trade	1	5	19	19	19	13	5	82	12
642 Retail Salespersons & Sales Clerks	1	9	31	31	31	20	8	130	9
643 Occ's in Travel & Accommodation	0	1	5	5	5	3	1	21	1
644 Tour & Rec. Guides & Amuse. Occ's	0	0	0	0	0	0	0	1	0
645 Occ's in Food & Beverage Service	0	3	10	10	10	6	2	41	1
646 Other Occ's in Protective Service	0	0	1	1	1	1	0	4	0
647 Childcare & Home Support Workers	0	2	7	6	6	4	2	27	3
648 Other Occ's in Personal Service	0	1	2	2	2	1	1	9	3
661 Cashiers	1	4	16	16	15	10	4	66	1
662 Other Sales & Related Occ's	1	4	14	14	14	9	4	60	5
663 Elemental Med. & Hospital Assistants	0	0	0	0	0	0	0	1	0
664 Food Counter Attendants & Helpers	0	2	8	9	8	6	2	36	1
665 Security Guards & Related Occ's	0	2	7	7	7	4	2	29	0
666 Cleaners	2	14	48	47	47	31	12	201	11
667 Travel / Accommodation / Recreation Attendants	0	0	1	1	1	1	0	6	0
668 Other Elemental Service Occ's	0	1	3	3	3	2	1	14	1
721 Contractors & Supervisors, Trades & Related	7	46	165	165	164	109	41	697	183
722 Supervisors- Railway & Motor Trans	0	1	2	2	2	1	1	9	1
723 Machinists & Related Occ's	0	1	6	6	5	4	1	23	2
724 Electrical Trades & Telecommunications Occ's	4	28	102	102	102	68	26	434	44
725 Plumbers, Pipefitters & Gas Fitters	3	18	66	66	66	44	17	281	57
726 Metal Forming / Shaping / Erecting Occ's	1	10	35	35	35	23	9	149	14
727 Carpenters & Cabinetmakers	6	40	141	139	140	93	36	595	200
728 Masonry & Plastering Trades	4	23	83	83	83	55	21	352	145
729 Other Construction Trades	5	29	106	106	106	71	27	451	167
731 Machinery / Transportation Equipment Mechanics	3	16	59	60	60	40	15	252	17

Table D-3

Incremental Employment Demand from Sea-to-Sky Highway Upgrade by Occupation, 2003 to 2009

	2003	2004	2005	2006	2007	2008	2009	Total	Self-Employed
732 Motor Vehicle Mechanics	0	3	10	10	10	7	3	43	7
733 Other Mechanics	0	3	9	9	9	6	2	40	12
734 Upholsterers / Tailors / Shoe Repairers / etc	0	1	2	2	2	1	1	9	3
735 Stationary Engineers / Power System Operators	0	1	2	2	2	2	1	10	0
736 Train Crew Operating Occ's	0	0	1	1	1	0	0	3	0
737 Crane Operators, Drillers & Blasters	0	3	10	10	10	7	3	44	3
738 Printing Press Operators / Commercial Divers / etc	0	1	2	2	2	2	1	10	2
741 Motor Vehicle & Transit Drivers	2	15	54	54	54	36	14	230	41
742 Heavy Equipment Operators	3	16	57	56	57	38	14	241	30
743 Other Transport Equipment Operators	0	0	1	1	1	1	0	5	0
744 Other Installers / Repairers / Servicers	2	10	36	36	36	24	9	153	37
745 Longshore Workers & Material Handlers	1	5	19	19	19	12	5	79	1
761 Trades Helpers & Labourers	5	31	110	108	106	69	26	453	47
762 Public Works & Other Labourers	0	1	2	2	2	1	1	9	0
821 Supervisors, Logging & Forestry	0	0	0	0	0	0	0	1	0
822 Supervisors, Mining / Oil / Gas	0	1	4	4	4	3	1	17	2
823 Underground Miners / Oil & Gas Drillers / etc	0	3	10	10	10	6	2	41	3
824 Logging Machinery Operators	0	0	1	1	1	0	0	3	0
825 Contractors / Operators / Supervisors: Agriculture	1	6	21	21	21	14	5	89	55
826 Fishing Vessel Masters & Skippers	0	0	0	0	0	0	0	1	1
841 Mine Service Workers & Operators in Oil	0	0	1	1	1	1	0	6	0
842 Logging & Forestry Workers	0	0	1	1	1	1	0	4	1
843 Agriculture & Horticulture Workers	0	1	2	2	2	1	0	8	1
844 Other Fishing & Trapping Occ's	0	0	0	0	0	0	0	0	0
861 Primary Production Labourers	1	5	19	19	19	12	5	80	14
921 Supervisors, Processing Occ's	0	2	7	7	7	4	2	28	1
922 Supervisors, Assembly & Fabrication	0	1	4	4	4	3	1	18	2
923 Central Control Operators: Manufacturing / Processing	0	1	4	4	4	2	1	16	0
941 Machine Operators: Metal & Mineral Products	1	4	13	13	14	9	3	57	5
942 Machine Operators: Chemical / Plastic / Rubber	0	0	1	1	1	1	0	5	0
943 Machine Operators: Pulp & Paper Prod	0	1	2	2	2	1	0	8	0
944 Machine Operators: Textile Processing	0	0	0	0	0	0	0	2	0
945 Machine Operators: Fabric / Fur / Leather	0	0	1	1	1	1	0	6	1
946 Machine Operators: Food / Beverage / Tobacco	0	0	1	1	1	1	0	6	0
947 Printing Machine Operators & Related Occ's	0	0	2	2	2	1	0	7	0
948 Mechanical, Electrical & Electronics Assemblers	0	1	3	3	3	2	1	14	1
949 Other Assembly & Related Occ's	0	2	6	6	6	4	1	25	4
951 Machining / MetalworkingWoodworking Operators	1	8	30	30	30	20	8	128	8
961 Processing / Manufacturing / Utilities Labourers	0	3	12	12	12	8	3	52	1
All	96	613	2,231	2,231	2,231	1,482	566	9,449	1,929

Table D4-A Incremental Employment Demand from RAV Rapid Transit by Occupation, 2004 to 2009 (Low Estimates)

Table D-4A

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (Low Estimate)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
001 Legislators & Senior Management	3	11	25	38	28	6	111	29
011 Administrative Services Managers	3	9	16	26	20	6	80	4
012 Managers in Financial / Business Services	3	6	13	20	15	4	61	6
013 Managers in Communication (Except Broadcasting)	0	1	2	3	2	1	9	0
021 Engineering / Science / Information Systems Mgr's	2	4	8	13	10	3	40	5
031 Health / Education / Social & Community Services Mgr's	0	1	2	3	3	1	10	1
041 Managers in Public Administration	0	0	1	1	1	0	3	0
051 Art / Culture / Recreation / Sport Managers	0	1	1	2	1	0	5	1
061 Sales, Marketing & Advertising Managers	5	12	23	37	28	8	112	24
062 Managers in Retail Trade	8	20	39	61	46	13	186	67
063 Managers in Food Service & Accommodation	3	7	15	24	18	5	72	27
064 Managers in Protective Service	0	0	0	0	0	0	0	0
065 Managers in Other Services	1	2	3	5	4	1	16	6
071 Managers in Construction & Transportation	24	59	117	181	139	39	559	255
072 Facility Operation & Maintenance Managers	1	2	4	6	5	1	18	2
081 Primary Production Managers	0	0	1	1	1	0	3	1
091 Managers in Manufacturing & Utilities	2	5	10	16	12	3	50	11
111 Auditors / Accountants / Investment Professionals	12	30	60	95	73	21	291	65
112 Human Resources & Business Service Professionals	3	8	15	24	18	5	73	23
121 Clerical Supervisors	4	9	19	31	23	7	93	1
122 Administrative & Regulatory Occ's	8	22	43	66	52	14	206	29
123 Finance & Insurance Administrative Occ's	9	22	42	65	49	14	201	46
124 Secretaries, Recorders & Transcriptionists	10	25	52	78	60	16	241	24
141 Clerical Occ's, General Office Skills	6	16	31	48	37	10	149	5
142 Office Equipment Operators	2	6	12	19	14	4	57	2
143 Finance & Insurance Clerks	11	28	56	85	65	18	263	8
144 Administrative Support Clerks	4	9	18	28	21	6	86	3
145 Library, Correspondence & Related Info. Clerks	3	7	15	23	17	5	69	1
146 Mail & Message Distribution Occ's	2	5	10	16	12	3	50	3
147 Recording / Scheduling / Distributing Occ's	7	17	34	52	39	11	160	4
211 Physical Science Professionals	1	2	3	5	4	1	16	3
212 Life Science Professionals	1	2	3	5	4	1	16	3
213 Civil / Mechanical / Electrical / Chemical Engineers	5	14	28	44	35	10	136	22
214 Other Engineers	3	8	16	25	20	6	77	9
215 Architects / Urban Planners / Land Surveyors	2	5	9	14	11	3	44	16
216 Mathematicians / Analysts / Programmers	10	24	48	76	56	16	229	46
221 Technical Occ's in Physical Sciences	1	2	4	7	5	1	21	2
222 Technical Occ's in Life Sciences	1	3	6	9	7	2	28	4
223 Civil / Mechanical / Industrial Engineering Technicians	4	9	17	26	20	6	82	12
224 Electronics / Electrical Engineering Technicians	6	14	29	46	36	11	140	19
225 Tech. Occ's in Architecture / Drafting / etc.	3	8	15	25	19	6	75	13
226 Other Technical Inspectors / Regulatory Officers	1	3	7	11	9	3	34	3
227 Transportation Officers & Controllers	0	1	3	3	3	1	11	1
311 Physicians / Dentists / Veterinarians	0	1	2	3	2	1	9	6
312 Optometrists / Chiropractors / Other Health Professions	0	0	0	0	0	0	1	1
313 Pharmacists, Dietitians & Nutritionists	0	1	2	3	2	1	9	1
314 Therapy & Assessment Professionals	0	0	1	1	1	0	4	1
315 Nurse Supervisors & Registered Nurses	1	2	5	7	6	2	23	0
321 Medical Technologists / Technicians	0	1	2	3	2	1	9	0
322 Tech. Occ's in Dental Health Care	0	0	0	1	1	0	2	0

Table D-4A

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (Low Estimate)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
323 Other Tech. Occ's in Health (Except Dental)	1	2	3	5	4	1	15	3
341 Assisting Occ's in Health Services	1	3	5	8	6	2	26	0
411 Judges / Lawyers / Notaries	4	10	21	32	24	7	98	50
412 University Professors & Assistants	0	1	2	2	2	1	8	1
413 College & Other Voc. Instructors	1	2	5	7	5	2	22	5
414 Secondary / Elementary School Teachers & Counsellors	1	3	7	11	8	2	33	0
415 Psychologists / Social Workers / Clergy	1	3	5	9	7	2	26	2
416 Policy & Program Officers	2	5	10	17	13	4	50	0
421 Paralegals / Social Services Workers / etc.	3	7	14	22	17	5	68	14
511 Librarians, Archivists, Conservators & Curators	0	0	0	1	1	0	2	0
512 Writing / Translating / Public Relations Professionals	2	5	9	14	11	3	44	16
513 Creative & Performing Artists	1	3	7	11	8	2	32	19
521 Technical Occ's: Libraries / Archives / etc.	0	0	0	1	0	0	2	0
522 Photographers / Graphic Arts Technicians / etc.	1	2	5	8	6	2	24	8
523 Announcers & Other Performers	0	0	1	1	1	0	4	1
524 Creative Designers & Craftspersons	3	8	15	24	18	5	74	36
525 Athletes, Coaches, Referees & Related Occ's	1	3	5	9	7	2	26	4
621 Sales & Service Supervisors	4	11	22	34	26	7	108	6
622 Technical Sales Specialists, Wholesale Trade	7	17	34	54	41	12	165	13
623 Insurance & Real Estate Sales Occ's	5	12	24	37	28	8	115	20
624 Chefs & Cooks	4	9	17	27	21	6	83	4
625 Butchers & Bakers	1	3	5	8	6	2	25	2
626 Police Officers & Firefighters	0	1	2	3	2	1	9	0
627 Technical Occ's in Personal Service	2	4	9	14	11	3	42	16
641 Sales Rep's, Wholesale Trade	8	20	41	63	49	14	195	26
642 Retail Salespersons & Sales Clerks	12	30	59	92	70	20	284	19
643 Occ's in Travel & Accommodation	1	4	7	11	9	2	35	1
644 Tour & Rec. Guides & Amuse. Occ's	0	0	0	1	1	0	2	0
645 Occ's in Food & Beverage Service	4	11	22	33	25	7	103	1
646 Other Occ's in Protective Service	0	1	2	2	2	1	8	0
647 Childcare & Home Support Workers	3	7	14	22	17	5	69	7
648 Other Occ's in Personal Service	1	2	4	7	5	1	20	7
661 Cashiers	6	15	30	46	35	10	143	2
662 Other Sales & Related Occ's	5	12	25	38	29	8	117	10
663 Elemental Med. & Hospital Assistants	0	0	0	0	0	0	1	0
664 Food Counter Attendants & Helpers	4	9	20	28	22	6	88	1
665 Security Guards & Related Occ's	2	5	10	15	11	3	46	1
666 Cleaners	11	27	52	81	62	17	251	39
667 Travel / Accommodation / Recreation Attendants	1	2	3	5	4	1	14	0
668 Other Elemental Service Occ's	1	2	5	7	6	2	23	2
721 Contractors & Supervisors, Trades & Related	27	67	134	207	158	44	637	168
722 Supervisors- Railway & Motor Trans	1	1	3	4	3	1	13	1
723 Machinists & Related Occ's	2	6	12	18	13	4	54	6
724 Electrical Trades & Telecommunications Occ's	16	41	82	127	98	28	392	40
725 Plumbers, Pipefitters & Gas Fitters	10	26	52	81	62	17	249	51
726 Metal Forming / Shaping / Erecting Occ's	6	14	28	44	34	10	136	13
727 Carpenters & Cabinetmakers	23	56	110	172	132	38	530	178
728 Masonry & Plastering Trades	13	33	65	101	77	22	310	127
729 Other Construction Trades	17	42	84	130	100	28	401	149
731 Machinery / Transportation Equipment Mechanics	10	26	52	82	62	18	251	17

Table D-4A

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (Low Estimate)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
732 Motor Vehicle Mechanics	3	9	17	27	20	6	83	14
733 Other Mechanics	2	4	9	14	11	3	43	13
734 Upholsterers / Tailors / Shoe Repairers / etc.	1	2	3	5	4	1	17	6
735 Stationary Engineers / Power System Operators	0	1	3	4	3	1	12	0
736 Train Crew Operating Occ's	0	0	1	1	1	0	3	0
737 Crane Operators, Drillers & Blasters	1	4	7	11	9	2	34	3
738 Printing Press Operators / Commercial Divers / etc.	1	2	4	6	5	1	19	3
741 Motor Vehicle & Transit Drivers	12	31	62	96	74	21	295	52
742 Heavy Equipment Operators	9	22	43	69	52	15	211	26
743 Other Transport Equipment Operators	0	1	2	2	2	1	7	0
744 Other Installers / Repairers / Servicers	6	16	31	48	37	10	149	36
745 Longshore Workers & Material Handlers	5	13	26	40	31	9	124	2
761 Trades Helpers & Labourers	18	43	85	129	97	27	398	42
762 Public Works & Other Labourers	0	1	2	3	2	1	10	1
821 Supervisors, Logging & Forestry	0	1	1	2	1	0	6	1
822 Supervisors, Mining / Oil / Gas	0	1	2	3	3	1	10	1
823 Underground Miners / Oil & Gas Drillers / etc.	1	2	4	6	5	1	19	1
824 Logging Machinery Operators	0	1	2	3	2	1	9	1
825 Contractors / Operators / Supervisors: Agriculture	4	10	21	33	25	7	100	62
826 Fishing Vessel Masters & Skippers	0	0	1	1	1	0	3	1
841 Mine Service Workers & Operators in Oil	0	0	0	1	1	0	2	0
842 Logging & Forestry Workers	1	1	3	4	3	1	13	2
843 Agriculture & Horticulture Workers	1	2	3	5	4	1	16	2
844 Other Fishing & Trapping Occ's	0	0	0	0	0	0	1	0
861 Primary Production Labourers	3	8	16	25	19	5	78	13
921 Supervisors, Processing Occ's	1	2	5	7	6	2	22	1
922 Supervisors, Assembly & Fabrication	2	5	9	15	11	3	45	4
923 Central Control Operators: Manufacturing / Processing	0	1	1	2	2	0	7	0
941 Machine Operators: Metal & Mineral Products	1	2	4	6	5	1	19	2
942 Machine Operators: Chemical / Plastic / Rubber	1	1	3	4	3	1	12	1
943 Machine Operators: Pulp & Paper Prod	1	2	4	7	5	1	21	1
944 Machine Operators: Textile Processing	0	1	1	2	1	0	6	1
945 Machine Operators: Fabric / Fur / Leather	1	2	4	6	4	1	18	2
946 Machine Operators: Food / Beverage / Tobacco	1	2	3	5	4	1	16	0
947 Printing Machine Operators & Related Occ's	1	1	3	5	3	1	14	1
948 Mechanical, Electrical & Electronics Assemblers	3	8	16	25	20	5	78	4
949 Other Assembly & Related Occ's	2	5	11	16	13	4	51	8
951 Machining / Metalworking/Woodworking Operators	8	20	40	62	47	13	190	11
961 Processing / Manufacturing / Utilities Labourers	3	9	18	25	20	6	82	2
All	498	1,256	2,502	3,888	2,972	840	11,957	2,221

Table D-4B Incremental Employment Demand from RAV Rapid Transit by Occupation, 2004 to 2009 (High Estimate)

Table D-4B

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (High Estimates)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
001 Legislators & Senior Management	4	14	30	46	34	8	136	36
011 Administrative Services Managers	4	11	21	33	25	7	101	5
012 Managers in Financial / Business Services	3	8	15	24	18	5	73	7
013 Managers in Communication (Except Broadcasting)	0	1	3	4	3	1	12	1
021 Engineering / Science / Information Systems Mgr's	2	5	10	15	12	3	47	6
031 Health / Education / Social & Community Services Mgr's	1	1	3	3	3	1	12	1
041 Managers in Public Administration	0	0	1	1	1	0	3	0
051 Art / Culture / Recreation / Sport Managers	0	1	1	2	2	0	6	1
061 Sales, Marketing & Advertising Managers	7	18	33	53	40	11	162	34
062 Managers in Retail Trade	10	25	49	77	59	17	236	85
063 Managers in Food Service & Accommodation	4	9	18	29	22	6	87	33
064 Managers in Protective Service	0	0	0	0	0	0	1	0
065 Managers in Other Services	1	2	4	6	5	1	20	7
071 Managers in Construction & Transportation	28	70	139	216	165	47	665	303
072 Facility Operation & Maintenance Managers	1	3	5	8	6	2	25	3
081 Primary Production Managers	0	0	1	1	1	0	4	1
091 Managers in Manufacturing & Utilities	3	8	16	25	19	5	76	17
111 Auditors / Accountants / Investment Professionals	13	34	68	106	83	24	330	74
112 Human Resources & Business Service Professionals	3	9	18	28	21	6	86	27
121 Clerical Supervisors	5	12	24	40	29	9	118	2
122 Administrative & Regulatory Occ's	10	27	53	81	64	18	253	36
123 Finance & Insurance Administrative Occ's	11	26	51	79	60	17	243	55
124 Secretaries, Recorders & Transcriptionists	11	29	60	90	69	19	279	28
141 Clerical Occ's, General Office Skills	8	19	37	58	44	12	179	6
142 Office Equipment Operators	3	7	15	23	17	5	70	3
143 Finance & Insurance Clerks	13	35	70	108	81	23	328	11
144 Administrative Support Clerks	5	11	22	35	26	7	107	4
145 Library, Correspondence & Related Info. Clerks	4	9	18	29	22	6	88	1
146 Mail & Message Distribution Occ's	3	6	13	20	15	4	61	4
147 Recording / Scheduling / Distributing Occ's	10	24	47	74	56	16	226	5
211 Physical Science Professionals	1	2	4	6	5	1	19	3
212 Life Science Professionals	1	2	4	6	5	1	18	4
213 Civil / Mechanical / Electrical / Chemical Engineers	7	17	34	54	43	12	165	27
214 Other Engineers	4	10	20	31	24	7	96	11
215 Architects / Urban Planners / Land Surveyors	2	5	10	16	12	3	49	17
216 Mathematicians / Analysts / Programmers	11	28	58	91	68	20	277	55
221 Technical Occ's in Physical Sciences	1	3	5	8	6	2	25	2
222 Technical Occ's in Life Sciences	1	3	7	11	8	2	33	4
223 Civil / Mechanical / Industrial Engineering Technicians	4	11	21	32	24	7	100	15
224 Electronics / Electrical Engineering Technicians	7	19	39	62	46	14	189	25
225 Tech. Occ's in Architecture / Drafting / etc.	4	9	18	29	23	7	90	15
226 Other Technical Inspectors / Regulatory Officers	1	4	8	13	10	3	40	4
227 Transportation Officers & Controllers	1	1	3	4	4	1	14	1
311 Physicians / Dentists / Vetennarians	0	1	2	3	3	1	11	7
312 Optometrists / Chiropractors / Other Health Professions	0	0	0	0	0	0	1	1
313 Pharmacists, Dietitians & Nutritionists	0	1	2	4	3	1	11	1
314 Therapy & Assessment Professionals	0	1	1	2	1	0	5	1
315 Nurse Supervisors & Registered Nurses	1	3	6	9	7	2	28	0
321 Medical Technologists / Technicians	0	1	2	4	3	1	11	0
322 Tech. Occ's in Dental Health Care	0	0	1	1	1	0	3	1

Table D-4B

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (High Estimates)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
323 Other Tech. Occ's in Health (Except Dental)	1	2	4	6	5	1	18	4
341 Assisting Occ's in Health Services	1	3	7	10	8	2	31	0
411 Judges / Lawyers / Notaries	5	11	22	34	26	7	105	53
412 University Professors & Assistants	0	1	2	3	2	1	9	1
413 College & Other Voc. Instructors	1	3	6	9	7	2	27	6
414 Secondary / Elementary School Teachers & Counsellors	2	4	8	13	10	3	39	0
415 Psychologists / Social Workers / Clergy	1	3	7	10	8	2	32	2
416 Policy & Program Officers	2	6	11	19	14	5	58	0
421 Paralegals / Social Services Workers / etc.	3	8	16	25	19	5	76	16
511 Librarians, Archivists, Conservators & Curators	0	0	1	1	1	0	3	0
512 Writing / Translating / Public Relations Professionals	2	5	11	17	13	4	52	19
513 Creative & Performing Artists	2	4	8	13	10	3	39	23
521 Technical Occ's: Libraries / Archives / etc.	0	0	0	1	1	0	2	0
522 Photographers / Graphic Arts Technicians / etc.	1	3	6	9	7	2	29	10
523 Announcers & Other Performers	0	1	1	2	1	0	5	1
524 Creative Designers & Craftspersons	4	9	18	28	21	6	85	41
525 Athletes, Coaches, Referees & Related Occ's	1	3	6	10	8	2	32	5
621 Sales & Service Supervisors	5	14	27	43	33	9	131	8
622 Technical Sales Specialists, Wholesale Trade	10	25	50	80	60	17	242	19
623 Insurance & Real Estate Sales Occ's	6	15	30	46	35	10	142	25
624 Chefs & Cooks	4	11	21	33	25	7	101	4
625 Butchers & Bakers	1	3	7	10	8	2	31	2
626 Police Officers & Firefighters	0	1	2	4	3	1	11	0
627 Technical Occ's in Personal Service	2	5	11	17	13	4	51	19
641 Sales Rep's, Wholesale Trade	12	29	60	93	72	20	285	42
642 Retail Salespersons & Sales Clerks	15	38	76	118	90	26	364	24
643 Occ's in Travel & Accommodation	2	5	9	14	11	3	44	2
644 Tour & Rec. Guides & Amuse. Occ's	0	0	1	1	1	0	3	0
645 Occ's in Food & Beverage Service	5	13	26	40	30	8	124	2
646 Other Occ's in Protective Service	0	1	2	3	2	1	9	0
647 Childcare & Home Support Workers	4	9	17	27	21	6	83	9
648 Other Occ's in Personal Service	1	3	5	8	6	2	24	9
661 Cashiers	7	19	37	58	44	13	178	2
662 Other Sales & Related Occ's	6	15	30	46	35	10	141	12
663 Elemental Med. & Hospital Assistants	0	0	0	0	0	0	2	0
664 Food Counter Attendants & Helpers	4	11	24	34	27	7	107	2
665 Security Guards & Related Occ's	2	5	11	17	13	4	52	1
666 Cleaners	13	33	64	99	76	21	305	47
667 Travel / Accommodation / Recreation Attendants	1	2	4	6	4	1	17	0
668 Other Elemental Service Occ's	1	3	6	9	7	2	28	2
721 Contractors & Supervisors, Trades & Related	32	81	160	248	189	53	764	201
722 Supervisors- Railway & Motor Trans	1	2	4	5	4	1	17	2
723 Machinists & Related Occ's	4	9	18	27	21	6	84	9
724 Electrical Trades & Telecommunications Occ's	20	49	98	153	117	33	471	48
725 Plumbers, Pipefitters & Gas Fitters	12	31	62	97	74	21	298	61
726 Metal Forming / Shaping / Erecting Occ's	7	17	35	54	41	12	166	15
727 Carpenters & Cabinetmakers	27	67	131	205	157	45	632	212
728 Masonry & Plastering Trades	15	39	77	120	92	26	369	151
729 Other Construction Trades	20	50	100	155	119	34	477	177
731 Machinery / Transportation Equipment Mechanics	13	34	68	105	80	23	323	21

Table D-4B

Incremental Employment Demand from RAV Rapid Transit Project by Occupation, 2004 to 2009 (High Estimates)

	2004	2005	2006	2007	2008	2009	Total	Self-Employed
732 Motor Vehicle Mechanics	4	11	22	35	26	7	106	18
733 Other Mechanics	2	6	11	17	13	4	53	16
734 Upholsterers / Tailors / Shoe Repairers / etc	1	2	4	7	5	1	21	7
735 Stationary Engineers / Power System Operators	1	2	3	5	4	1	15	0
736 Train Crew Operating Occ's	0	0	1	1	1	0	5	0
737 Crane Operators, Drillers & Blasters	2	4	9	14	11	3	43	3
738 Printing Press Operators / Commercial Divers / etc	1	2	5	8	6	2	24	4
741 Motor Vehicle & Transit Drivers	16	41	81	127	97	27	389	69
742 Heavy Equipment Operators	11	27	52	83	63	18	254	31
743 Other Transport Equipment Operators	0	1	2	3	2	1	10	0
744 Other Installers / Repairers / Servicers	7	19	38	58	45	13	181	43
745 Longshore Workers & Material Handlers	7	18	37	56	43	12	173	2
761 Trades Helpers & Labourers	21	51	101	154	115	32	474	49
762 Public Works & Other Labourers	1	1	3	4	3	1	12	1
821 Supervisors, Logging & Forestry	0	1	2	3	2	1	8	1
822 Supervisors, Mining / Oil / Gas	1	1	3	4	3	1	14	1
823 Underground Miners / Oil & Gas Drillers / etc	1	3	6	9	7	2	27	2
824 Logging Machinery Operators	0	1	2	4	3	1	12	1
825 Contractors / Operators / Supervisors: Agriculture	5	13	25	39	30	9	121	74
826 Fishing Vessel Masters & Skippers	0	0	1	1	1	0	4	2
841 Mine Service Workers & Operators in Oil	0	0	1	1	1	0	3	0
842 Logging & Forestry Workers	1	2	4	6	4	1	17	3
843 Agriculture & Horticulture Workers	1	2	4	6	5	1	20	3
844 Other Fishing & Trapping Occ's	0	0	0	0	0	0	1	0
861 Primary Production Labourers	4	10	20	31	23	7	95	16
921 Supervisors, Processing Occ's	1	3	7	10	8	2	32	1
922 Supervisors, Assembly & Fabrication	3	7	15	23	18	5	71	6
923 Central Control Operators: Manufacturing / Processing	0	1	2	3	2	1	10	0
941 Machine Operators: Metal & Mineral Products	1	3	6	9	7	2	29	2
942 Machine Operators: Chemical / Plastic / Rubber	1	2	4	6	5	1	19	1
943 Machine Operators: Pulp & Paper Prod	1	3	6	9	7	2	28	1
944 Machine Operators: Textile Processing	0	1	2	3	2	1	9	1
945 Machine Operators: Fabric / Fur / Leather	1	3	6	9	7	2	27	3
946 Machine Operators: Food / Beverage / Tobacco	1	2	4	7	5	1	20	1
947 Printing Machine Operators & Related Occ's	1	2	4	6	4	1	17	1
948 Mechanical, Electrical & Electronics Assemblers	6	14	27	43	33	9	132	7
949 Other Assembly & Related Occ's	3	8	16	24	19	5	74	11
951 Machining / MetalworkingWoodworking Operators	11	29	57	88	68	19	275	18
961 Processing / Manufacturing / Utilities Labourers	5	12	26	38	29	9	116	2
All	620	1,583	3,114	4,837	3,698	1,046	14,877	2,704

Appendix E Recommendations from Key Informants

We are pleased to list a variety of recommendations made by key informants during interviews. The diversity of these ideas reflects the diverse experience and knowledge of the people who shared their thoughts with us. A number of these ideas may be considered as summarized in RKA's recommendations.

Recommendations related to Chapter 6 First Nations—Supply and Demand

1. Design initiatives to draw First Nations youth into high demand occupations as workers; emphasis on entrepreneurial training and approach, not just training (government/organizations, several sectors). — From Key Informants, Multiple Sources

2. Design innovative approaches to bringing opportunities to First Nations people; emphasis on entrepreneurial training and approach, not just training; community development initiatives for First Nations people off reserve (government/organizations, several sectors). — From Key Informants, Multiple Sources

3. Develop the huge potential in Adventure Tourism (particularly for consideration by First Nations). — From Key Informants, Tourism Sector

4. Take advantage of the great opportunity to engage First Nations workers; plan for specifically needed training for them. — From Key Informants, Tourism Sector

5. Open up more opportunities to First Nations, at all levels: includes management in Olympics/related projects (large population of First Nations graduates, to MA level, not getting jobs.) — From Key Informants, First Nations

6. Implement the concept of a coordinator, a contact in the project to ensure First Nations opportunities, as was done with Lions Gate bridge redecking and the rapid transit upgrade. — From Key Informants, First Nations

7. Continue the Aboriginal Secretariat arrangements (Olympic Bid Secretariat), which works very well. — From Key Informants, First Nations

8. When training opportunities come available for First Nations people, ensure reasonable lead time, not impossibly short notice to fill seats. — From Key Informants, First Nations

9. Put in place measures to facilitate First Nations people getting training/credentials in trades now that ITAC is gone. — From Key Informants, First Nations

Recommendations related to Chapter 7 Vancouver's inner-city Neighbourhoods—Supply and Demand

1. As a basis for strategy and planning, carry out a Return on Investment analysis, looking at the benefits of utilizing current 'income assistance' and other unemployed as source of

supply, i.e. the cost of training and return to employment vs. the cost of maintaining welfare and other social/health expenses. — From Key Informants, Government and Organizations

2. Relate supply fulfillment efforts from inner city to the overall impact on local community economic development; make employment a factor in local community economy and social health. — From Key Informants, Government and Organizations

3. Leverage or integrate multi-year demand into planned apprenticeship programs, i.e. building from lower skilled work to higher skills through programs of incremental steps. — From Key Informants, Government and Organizations

4. For young people at risk and Downtown Eastside, develop innovative assessment tools to identify transferable skills, even from unlikely background and experience. — From Key Informants, Government and Organizations

Recommendations related to Chapter 8 2010 Volunteers

1. Use volunteering as opportunities for target groups; use volunteering to implement the deliberate diversity policy of the Olympics. — From Key Informants, Government and Organizations

2. When deciding groups to target for volunteers, think creatively to include more diverse groups than "just calling the Lions Club". — From Key Informants, Government and Organizations

3. Develop Outreach – to ensure target groups have information/access to volunteering opportunities. — From Key Informants, Government and Organizations

4. Ensure that Olympics volunteers include First Nations, Asians, others, across the board; it should be cross-cultural. — From Key Informants, First Nations

5. Promote the concept among First Nations that volunteering brings skills and other job-related benefits. — From Key Informants, First Nations

Recommendations related to Chapter 9 Labour Supply

1. Ensure there is a BC/Canada first hiring policy for these high-profile initiatives; recognize that large projects will draw workers back to BC. (government/organizations and several sectors)— From Key Informants, Multiple Sources

2. Review and target for change any regulations that tend to prevent people from working, such as obsolete or excessive rules around the safety system (Gas-plumbing, electrical need to be revisited), artificial apprentice/journeyperson ratios, collective agreements that buy labour peace at the price of being too restrictive. (Construction) — From Key Informants, Multiple Sources

3. Likewise, review and target for change any regulations that tend to prevent new people from coming to BC or former BC residents from returning, such as too long a wait for

health care eligibility, strict "BC credentials", etc. (government/ organizations, several sectors). — From Key Informants, Multiple Sources

4. Use the opportunity of the Olympics and related projects to promote skilled trades as a career and attract people into the skilled trades — actions for both government and industry. (Construction, other sectors). — From Key Informants, Multiple Sources

5. Ensure that maximum efforts are made to "share the wealth"/promote opportunities for areas outside the Lower Mainland. — From Key Informants, Government and Organizations

6. Plan early to ensure ability to deliver (e.g. levels of service, service skills, customer interaction) when marketing of BC destinations is done.). — From Key Informants, Government and Organizations

7. Ensure organized labour is brought into the work of the Committee. — From Key Informants, Government and Organizations

8. Put into the bids how employers may bear the costs of labour market change; ask bidders to demonstrate to what extent they will deal with the adequate supply of workers on their own, e.g. making investment at private institutions. — From Key Informants, Government and Organizations

9. Continue the provincial HR Strategies initiative on a priority basis. — From Key Informants, Government and Organizations

10. Design initiatives to get trainees and employers to talk together, no longer leave all the influence over training to the training sector. — From Key Informants, Government and Organizations

11. Plan early how to ensure that short term training supports lasting value training needs. — From Key Informants, Government and Organizations

12. Strategize with the view that large projects are an opportunity for pent-up supply of willing young people to inject itself into skilled trades training. — From Key Informants, Construction Sector

13. Design tax incentives for people to invest in training: tax write-offs at very high rates for the expense of training against income. — From Key Informants, Construction Sector

14. Design a provincial program of proper apprenticeship and full training; a rigorous 4 year program to produce fully qualified tradespeople. — From Key Informants, Construction Sector

15. Remove impediments to entry/training in the building trades (e.g. lack of financial support like scholarships/bursaries). — From Key Informants, Construction Sector

16. Induce participation in skilled trades (such as construction) by young people: the idea of preferential opportunities for apprentices in those trades to be involved in Games/related projects.) — From Key Informants, Technology Sector, re Construction sector

Recommendations related to Chapter 10 Demand-Supply Gaps

1. Ensure there is advance planning, an early assessment, close attention to timing of needs and projects, early communication and announcements of opportunities. (government/organizations and several sectors) — From Key Informants, Multiple Sources

2. Coordinate and plan components of large projects so all demand in a sector/occupation does not fall at once. (government/organizations and several sectors) — From Key Informants, Multiple Sources

3. Give incentives for corporate sectors to do more HR planning through tax breaks and leverage programs (government/organizations, construction) — From Key Informants, Multiple Sources

4. Plan for unexpected consequences of labour demand (if growth industries attract people, do they attract them away from unexpected sectors?) (government/organizations, retail) — From Key Informants, Multiple Sources

5. Plan for unexpected consequences if labour demand of Games/related projects fall during a boom economy. (Government/organizations; several sectors). — From Key Informants, Multiple Sources

6. Avoid government trying to lead the market; let industry lead the planning (government/organizations, several sectors). — From Key Informants, Multiple Sources

7. Invest in program of promotion of the merits of careers in skilled trades (both government and industry) (government/organizations, several sectors). — From Key Informants, Multiple Sources

8. Put more time and money into a coordinated effort to address HR problems, particularly those of small business.— From Key Informants, Government and Organizations

9. Provide tools for employers to monitor their own company's/ industry's imbalances to identify HR problems earlier. — From Key Informants, Government and Organizations

10. Develop innovative approaches to using non-traditional sources of labour; e.g. older workers in terms of trainers/mentors.— From Key Informants, Government and Organizations

11. Collaboratively develop initiatives in the retail industry such as accreditation, the branding of retail as a viable career, to make retailers more competitive for labour amongst sectors, not only for customers. — From Key Informants, Retail Sector

12. Develop initiatives in the tourism sector for career awareness and retention ("Training is not the answer. Career awareness and retention is the answer.") — From Key Informants, Tourism Sector

13. Need to assess the projected demand gaps and prepare accordingly. — From Key Informants, Tourism Sector

14. Design changes to improve tourism recruitment and retention, e.g. a no-tip culture with a living wage like Australia's, improved HR practices; industry collaboration on education, Magnet Schools. — From Key Informants, Tourism Sector

15. Let the industry do basic training and address the need to attract the right trainees (replacing huge expenditures in public education for tourism-related workers; government not getting its money's worth). — From Key Informants, Tourism Sector

Appendix F — Additional Material on Volunteers

Notes on Volunteers at other events

For the 2003 Bathurst, N.B. Canada Winter Games, early projections were for 6,000 volunteers. Closer to Games time, the estimate was 6,400. At closing, March 9 2003, the CBC reported that there had been 7,000 volunteers, 17 percent over the projections. Estimated counts for Victoria's 1994 Commonwealth Games range from 13,000-14,000. For the Calgary Winter Olympics, 1988, we can find figures ranging from 9,500-11,500 volunteers.

Predictions are not always precise, and historical volunteer counts are difficult to track, because of:

a) turnover (also occurs with paid employees)
b) Games-time/pre-Games variations in total (also occurs with paid employees) – and the decision to present peak figures or cumulative totals
c) some inconsistency in recording "sport volunteers" (specialists in the various winter sports) along with the functional volunteers
d) inconsistency in recording opening and closing ceremonies performers as part of the total (these performers are some 7,100 for Salt Lake City), or as "participants"
e) inconsistency in counting/including voluntary efforts by military personnel, police auxiliaries, etc., and also volunteers that the armed forces hold in "reserve" who do not actually work
f) overlap, and failure to distinguish between volunteers for the Olympics and the Paralympics – variations can be several thousands, and appear to be nearly impossible to clarify.

For the above reasons, volunteer records are not always consistent amongst different reports on the same Games/events, nor from one event to another.

The rounded figures in the following table are a best estimate, and we should keep in mind variation due to factors a)-f) above.

Table 33 Volunteer Figures for Past Olympics and other large events

Past Winter Olympics

Event	Paid Staff	Total Volunteers	Notes
Salt Lake City 2002 high estimate	10,312	30,570	includes opening and closing ceremonies performers
Salt Lake City 2002 low estimate	8,600	24,000	
Nagano 1998	unavailable	32,000	plus 15,000 helping stage the cultural program
Lillehammer 1994	881	11,154	Total includes 2,100 armed forces volunteers 13,729 volunteer applicants
Albertville 1992	unavailable	8,000	An additional 7,800 police officers, soldiers and firefighters provided security – some as volunteers?
Calgary 1988 high estimate	490	16,796	includes sport volunteers 24,117 volunteer applicants
Calgary 1988 low estimate	490	9,526	Figure shown is during the games; 11,680 participated in countdown year

Other Events

Event	Paid Staff	Total Volunteers	Notes
Athens 2004	unavailable	60,000	(planned)
Bathurst-Campbellton Canada Winter Games, 2003	unavailable	7000	most recent estimate
Manchester 2002 Commonwealth Games	unavailable	15,000	24,000 volunteer applicants
Sydney 2000 high estimate	unavailable	60,000	
Sydney 2000 low estimate	unavailable	53,650	
Winnipeg Pan American Games 1999	unavailable	18,575	includes sport volunteers
Atlanta 1996	unavailable	60,422	
Commonwealth Games Victoria BC 1994	unavailable	14,000	plus several thousand others, performers in opening and closing ceremonies
Barcelona 1992	unavailable	34,548	
Expo 86	15,000 to 37,000	15,000	turnover accounts for paid staff figures, probably affects volunteer figure as well

Sources:
See Works Cited list for all sources

Differentiating "Sport Volunteers" from Volunteers for other functions at Olympic Games

A sizeable portion of the volunteer complement consists of "Sport Volunteers", specialists in the various winter sports assisting at venues, etc. The logical providers of these volunteers are the sports organizations themselves. In fact, the Norwegian Olympic Organizing Committee turned to sports clubs as the major source for all kinds of volunteers in Lillehammer. To give an idea of the size of the Sport Volunteers complement, here are figures from some recent Winter

Games. Our sources are two similar reports, the Final Reports published at the end of the Games.

It is important not to be too restrictive in looking at volunteer positions. We have considered "sport volunteers" as a separate category, but undoubtedly expertise and networking in sports activities will be job-related and will lead to careers for a great many people. Part of the legacy of an Olympics is not only the world-class facilities they leave behind, along with a complement of people trained in their operations and maintenance, and the profile of the local area as a sports haven, but the development of sports expertise and contacts among the local population. However we do consider that involvement with the sports groups is the entry-point to this occupational field. It almost always comes about from a passion for the sports activity, or at least a goal of excelling in the sport. It is in that way somewhat dissimilar from other fields of paid work where a person may consider the need for income before considering exactly which industry or job to choose.

Table 34 Sport Volunteers: Some Recent Winter Games.

Salt Lake City		Calgary	
Venues	**Sport Volunteers**	**Venues**	**Sport Volunteers**
Snowbasin Ski	1485	Alpine	665
Park City Giant Slalom	305	Freestyle	94
Deer Valley Resort	265	Disabled Skiing	41
Utah Olympic Park Ski Jumping	197	Ski Jumping	198
Utah Olympic Park Nordic Combined	197	Nordic Combined	9
Utah Olympic Park Bobsleigh	125	Bobsleigh	97
Utah Olympic Park Skeleton	125		
Utah Olympic Park Luge	133	Luge	97
Soldier Hollow Biathlon	270	Biathlon	230
Soldier Hollow Cross Country	332	Cross Country	295
Soldier Hollow Nordic Combined	332		
SLC Ice Center Figure Skating	93	Figure Skating	123
SLC Ice Center Short Track	47	Short Track Speed	99
Ice Sheet Ogden Curling	111	Curling	147
Ice Sheet Ogden Speed Skating	57	Speed Skating	95
E Center and the Peaks Ice Arena Ice Hockey	181	Hockey	167
Total	4255	Total	2357

Sources:
Salt Lake 2002. Official Report of the XIX Olympic Winter Games,
Official Report, 1988 15th Olympic Winter Games Calgary (Canada)

RKA has accessed information to attest to the level of volunteerism in British Columbia. These include the following:

Volunteering

One in three British Columbians volunteer their time, energy and abilities for charitable and community organizations. This amounts to 169 million hours, the equivalent of 88,251 full-time year-round jobs (40 hours per week for 48 weeks). Some segments of the population are more likely to volunteer their time. The volunteer rate was relatively constant among age groups□35 to 44 year olds (37%), and 25 to 34 and 45 to 54 year olds was (36%), were followed by 15 to 24 year olds (28%). As expected, those individuals working part-time had more time to donate □46%, compared to full-time workers (33%). There is evidence that the higher the education level, the greater the propensity for a person to participate in volunteer activities. Volunteers with a university education had a higher participation rate (48%) than those with less than high school education (23%). Among the unemployed volunteers, over half believed their volunteer efforts would increase their chances of finding employment or gaining new skills. For unemployed, young volunteers this was particularly so□46% stated they had acquired new skills and 28% thought their volunteering had increased their chances of success in paid work or business ventures.

—Source: Statistics Canada http://www.bcstats.gov.bc.ca/releases/info99/hl9935.htm

Volunteers

A quarter of Canada's seniors 55 and older volunteered time formally through organizations, according to a 1997 survey - an overall rate that has remained virtually unchanged from a decade earlier.

—Source: SC, Catalogue 75-001-XPE

Approaches to Management of Volunteers – Other events

Calgary[46]

- Largely a reactive response to 20,000 plus volunteer applications (starting early)
- Attention to "fit", matching skills and interests with need; volunteer assessment
- Training (Olympic movement aims, that of the Organizing Committee, job-specific training)

[46] p. 203

- Business-like structure and experience. "Each committee was structured like a corporation, with a chairman…."
- Profile, responsibility:
- "Volunteers filled some of the Games' most important roles…"
- clothing to enhance profile and self-esteem (also erased distinction between paid workers and volunteers)
- rewards, recognition: events, clothing, commemorative gifts
- events to make people feel part of the team; monthly, plus occasional information forums
- frequent requests for feedback from individuals; chairs had Ombudsmen role
- Olympic Volunteer Centre; large, open long hours; used for assembly/ training/ identification

Manchester 2002

- Key theme of volunteer program "count yourself in" – social inclusion

SLC Organizing Committee

Communications during recruitment campaign:

- Targeted 4 groups for volunteers
  - Businesses/employers/sponsors
  - Education (students, staff)
  - Religion
  - Civic and Community (with an objective of ensuring diversity of volunteers)

Sydney Games (Sydney 2000 – State Chamber of Commerce)

- Training designed to give volunteers accreditation toward other "tertiary education courses". Designed to OCOG requirements and delivered by "Tertiary" colleges
- SOCOG determined a benchmark of job quality "below which unpaid people were not asked to work. Hence volunteers were not employed as cleaners or bedmakers, but were involved in activities that added an Olympic/Paralympic experience to their daily work."
- Volunteers "set the benchmark" in Sydney for customer service
- Recognition that exposure and contacts made during volunteering can generate leads for paid employment later. (all above on p. 27)

Lillehammer (05-01)

- Two years before the event, organizers conducted a "thorough investigation of the qualitative and quantitative need for volunteers in the various departments."
- These estimates were verified through test and training events, and pilot projects for testing approaches to volunteer assignment. (p. 129)
- Targeting of organizations as sources of volunteers (not businesses, not schools, churches, but Sports Organizations)
- "A parliamentary bill from the Norwegian Parliament..." was the basis for the volunteer recruitment activities.
- Bill was central in planning training activities. It stated "The Olympic Games can contribute to increasing the level of expertise...."
- The bill pointed out that local sports organizations had tremendous experience organizing events. "It was considered "cost-efficient" to use them, as well as armed forces personnel.
- Team 94 centre at each venue: information and help, rest and rec. Volunteer centre in Lillehammer; social, meals,
- Main goals of the recruitment strategy:
  - recruit "as many local volunteers as possible...."
  - recruit "persons with the necessary qualifications, so... the Games would be a success"
  - "to ensure that people throughout Norway felt like they were participating in the event."
- Team 94 decided to enter into collaborative agreements with various organizations (in this case largely sports organizations).
- To ensure widespread "feeling of participation" around a third of the sports clubs contracted were from different parts of the country.
- Team 94 employed a process it called "goal-oriented pyramid recruitment":
  - clear identification of needs before recruiting starts
  - targeting of organizations known to contain the necessary expertise
  - first recruiting leaders and key volunteers
  - participation of leaders in selecting their staff
- Apart from that program, large numbers of unsolicited enquiries were received. Registration in a database was offered; used as a backup source of staff.
- Volunteer recruitment offices were set up close to each target (local) area.
- Arrangements made to ensure 16-day leave or availability – flexibility arranged with employers, schools, organizations.
- A volunteer quality assurance program to ensure participation once recruited and trained.

According to the Lillehammer report, "the goal-oriented, pyramid recruitment programme had clear advantages compared to a strategy of recruiting a large mass of people and [assigning] tasks. The 'mass method' requires tremendous

resources, and it also [necessitates rejections]". (p. 129) The Lillehammer approach includes practices that were used in other Games (targeting; like SLC; arrangements with employers, like Calgary, SLC, others; the emphasis on development of close teamwork within the OCOG which included volunteers – most Olympics).

Implicit in the "rejections" problem above is the eager uptake of volunteer opportunities for an Olympics. The finding in all the Games studied has been that people in local communities attach value to the volunteer experiences; they recognize advantages and worthwhile experiences to be gained from Olympic volunteer work. The jobs are much sought-after.

So the recruiters of volunteers can consider the jobs as a benefit to bestow on communities, much in the way the paid jobs are. Organizing committees can target strategically the communities they wish to engage in volunteer work, in order to achieve the committee's goals. The goals can include such things as efficient delivery, taking advantage of expertise, and development opportunities for identified social groups.

Recognition of this potential was made manifest in Toronto's Social Equity Workplan. Some of its strategies include:

- Identified target markets in the plan (youth, newcomers, equity-seeking groups)
- Use games as a catalyst for pro-active and collaborative planning to better serve both target markets and the private sector
- Labour force readiness study; assess training capacity of existing facilities; identify gaps
- Identify systemic barriers that prevent equitable access
- Develop equitable Hiring Practices process
- Comprehensive outreach plan to target groups
- Develop strategies to ensure that equity seeking communities are aware of and have access to Olympic commercial development opportunities
- Equitable volunteer practices
- Ensuring volunteer and paid employment guidelines are developed, through a partnership of Olympic organizers, employers, community equity groups
- Strategies to ensure that equity seeking groups have equal access to volunteer opportunities

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